

BHARAT PETROLEUM CORPORATION LIMITED

PIPELINES ENTITY

SCOPE OF WORK, SPECIFICATIONS & SPECIAL CONDITIONS OF CONTRACT

**RELAY COORDINATION & SYSTEM STUDY ALONG WITH RELAY TESTING OF
PROTECTION RELAYS AT PIPELINE LOCATIONS (PERIOD OF 3 YEARS)**



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SECTION 01 – SCOPE OF WORK

1. INTRODUCTION

Bharat Petroleum Corporation Ltd. operates multiproduct, cross-country pipelines across India to transport petroleum products from refineries to downstream locations. These pipelines include various pumping and receipt stations equipped with high-voltage (HV) and medium-voltage (MV) loads, as well as generating sources. Each station is supported by switchboards, measuring instruments, and isolating equipment at HV, MV, and low-voltage (LV) levels.

As part of the preventive and predictive maintenance plan, in line with OISD and PNGRB guidelines, the objective is to conduct a one-time system study along with relay coordination analysis. In addition, yearly relay testing will be carried out for a period of three years at the pipeline locations.

2. BRIEF SCOPE OF WORK

The scope of this contract is to carry out the required studies and testing in accordance with these specifications, with the objective of assessing the health of the protection systems across the following pipeline sections:

Sr No	Pipeline	Location	State	System Study & Relay Coordination (One-time)	Relay Testing (Yearly)
1	MMBPL	Mumbai	Maharashtra	Required [#]	Required
2	MMBPL	Washala	Maharashtra	Required [#]	Required
3	MMBPL	Manmad	Maharashtra	Required	Required
4	MMBPL	Sanghavi	Maharashtra	Required	Required
5	MMBPL	Gujari	Madhya Pradesh	Required ^{&}	Required
6	MMBPL	Mangliya	Madhya Pradesh	Required ^{&}	Required
7	MMBPL/BKPL/KJPL	Kota, Sherpur	Rajasthan	Required at Kota	Required
8	MMBPL	Malarna	Rajasthan	Required	Required
9	MMBPL	Bharatpur, Karwadi	Rajasthan	Required at Bharatpur	Required
10	MMBPL	Mathura	UP	Not Required	Required
11	MMBPL/PJPL*	Piyala	Haryana	Required	Required
12	MMBPL	Bijwasan	New Delhi	Not Required	Required
13	BPPL/BKPL/VBPL	Bina	Madhya Pradesh	Required	Required
14	MUPL	Uran	Maharashtra	Not Required	Required
15	BPPL	Maheba	UP	Not Required	Required
16	BPPL	Panki	UP	Not Required	Required
17	KJPL	Jobner	Rajasthan	Not Required	Required
18	VBPL	Vadinar	Gujarat	Not Required	Required
19	VBPL	Thamna	Gujarat	Required	Required
20	VBPL	Bawdi	Madhya Pradesh	Required	Required
21	CCKPL	Cochin	Kerala	Required	Required

22	CCKPL	Coimbatore	Tamil Nadu	Not Required	Required
23	CCKPL	Karur	Tamil Nadu	Not Required	Required
24	KHPL	Krishnapatnam	Andhra Pradesh	Not Required	Required
25	KHPL	Ongole, IP02	Andhra Pradesh	Not Required	Required
26	KHPL	Malkapur	Telangana	Not Required	Required
27	PJPL*	Jewar	Haryana	Not Required	Required
28	MRPL*	Rasayni	Maharashtra	Not Required	Required

*PJPL and MRPL are planned for commissioning; actual execution shall start after instruction of EIC.

At Mumbai & Washala, we will be replacing existing pump (MLP-A, B & C) with higher rated pumps, System study and relay coordination to be planned after the replacement of pumps.

& At Mangliya & Gujari bidder shall account for ongoing and future modifications/upgradations of electrical, instrumentation, control, and associated systems:

Mangliya	Gujari
- Replacement of existing Yaskawa VFD (2300 KVA) with new Hitachi VFD (2200 KVA). - Replacement of existing Hitachi UPS (20 KVA) with new UPS (30 KVA). - Replacement of existing DG set (125 KVA) with new DG set (160 KVA).	- Replacement of existing Siemens VFD with new Hitachi VFD (2200 KVA). - Replacement of existing Hitachi UPS (15 KVA) with new UPS (30 KVA). - Replacement of existing DG set (125 KVA) with new DG set (160 KVA).

Summary of Scope of Work:

- Testing of relay shall include both ELECTRO-MECHANICAL and NUMERICAL RELAYS including Incomer, Feeder Protection, Differential Protection (Cable, Transformer, Motor), Motor Protection, Transformer Protection, Generating Feeder (Solar, DG set) etc.
- The system study shall include minimum of the following analyses:
 - Load flow analysis
 - Short Circuit Analysis
 - Motor starting analysis
 - Motor on load analysis
 - Relay Coordination analysis from Incomer level, 11kV/6.6kV feeder level to 415V incomer level including LT motor loads such as booster motors
 - Determination of fault level (3-phase and single line to ground) and creating a comparison with existing system fault level and recommendatory design analysis
 - Transient analysis (To be performed in case of paralleling of two power sources)
 - Grid Islanding scheme (To be performed in case of HV/MV DG is operating in parallel with power grid supply)
- The study, testing and Instrument Proving shall be performed as per minimum steps mentioned in this document and shall also include additional actions as per National/International codes & standards.
- All materials, equipment, instruments, manpower (skilled/unskilled), consumables, tool-tackles required to carry out the jobs are in the scope of contractor including their mobilization & demobilization, lodging, boarding, etc.
- All measuring instruments should have valid Calibration certificates traceable to NABL/International standards/equivalent reputed accreditation agency or from OEM, submitted before the start of the job.
- Site procedures prepared by the contractor for testing, Instrument Proving and study shall cover minimum requirements as per guidelines given in this document and to be submitted by the contractor before PQT.
- Reporting formats shall be as per the format of BPCL/equipment manufacturer/ the format approved by BPCL EIC.
- Along with a detailed report, a summary report is to be prepared station-wise on the relay testing report by the contractor.
- The job is to be carried out in a working plant. Hence all necessary safety requirements shall be fulfilled, and all precautions shall be taken to not disrupt plant operations.

3. DETAILED CONTRACTOR'S ORGANIZATION FOR THIS WORK & COMPETENCIES

3.1 Contractor's Scope for Relay Testing & Instrument Proving

The scope of work includes inspection, servicing, testing, Instrument Proving, correcting wiring problems and minor repair of various types of Protective and Auxiliary relays. This job is to be carried out at Pipeline locations. Most of the job is to be carried out in a running plant; therefore, the contractor has to take utmost care to avoid nuisance tripping. Contractor shall designate an experienced Project Manager who shall observe & manage the entire operations.

The Contractor shall arrange his own testing equipment. List of minimum testing equipment is given below:

- Universal **Automatic Computerized Relay Test Kit** for testing of numerical and static relays.
 - Secondary Voltage and Current Injection Test Set having sufficient burden capacity for dynamic and static testing of differential protection schemes of 1 Amp and 5 Amp rating.
 - Secondary Current Injection Test Set having sufficient burden capacity for testing electro-mechanical over-current & earth-fault relays of 1 Amp and 5 Amp rating.
- Multi meters (Digital & Analog).
- Tong Testers: high range and low range.
- Equipment for testing of auxiliary/secondary protection relays such as over-voltage, under-voltage, restricted earth-fault, circulating current differential relays, Sync check, auxiliary relays etc.
- The testing equipment shall be calibrated from a Govt./Govt. approved/NABL accredited laboratory. Calibration certificates shall not be older than one year on the date of testing.
- The testing work will be witnessed/authenticated by the representative of BPCL.
- It is highly recommended that the vendor should visit the site to clearly assess the requirement of job as mentioned in scope of work.

3.2 Relay Testing Requirements

The Contractor shall be required to carry out the following works during routine testing:

ISOLATION:

- Draw out the relay from the cabinet after isolation of the feeder.
- Note down the ferrule number of non-draw out type relay.
- Note down the make, serial number, panel number & all settings.
- Note down the termination details. Termination details shall be checked & signed by BPCL officer.

INSPECTION:

The relays shall be inspected for any visible damage, dislocation or defect of mechanical parts, circuit components, improper operation of the mechanism, poor mechanical settings, adjustments, misalignment of contacts, improper internal/external wiring, loose connections, poor soldering, wrong polarity of voltages etc. The insulation resistance between all isolated circuits and with respect to earth shall be tested as per Indian standards.

SERVICING OF RELAYS:

The relays shall be thoroughly cleaned and checked by using appropriate cleaning agents and tools as recommended by their manufacturers. Contact resistance shall be checked, contact surfaces inspected and in case of defects cleaned using the specified burnishing tools.

TESTING:

The relays shall be tested for accurate operation in their adopted settings as well as their standard settings. The following General Tests shall form part of the testing procedures:

- Test of Pick-up and Drop-off values of each relay unit within the relay case.
- Test of the characteristic of operation and comparison with standard results.

- Test of continuity and resistance measurement of relay coils.
- Testing for proper closing/opening of contacts, proper operation of auxiliary units, and operation indication by flag indicators.
- In case of under frequency relays, pick-up checks and pick-up/drop-off differential checks at various settings.
- Directional properties of Directional Current/Power relays to be checked.
- Each relay shall be tested for all features according to the testing procedure given by manufacturer and as per relevant IS specifications.

3.3 System Study Requirements

The System Study with on-site visit for data collection and analysis shall include a minimum of 6 days of site visit by vendor representatives. The following main jobs are to be carried out:

- Load flow analysis
- Power quality analysis: Continuous measurements of harmonics, surges, transients and other power problems affecting critical equipment.
- Short Circuit Analysis
- All level dynamic, time series load flow analysis (Based on mutual agreement and feasibility, Static Load flow analysis can also be performed), short circuit analysis, transient response analysis, harmonic analysis including DG starting analysis, motor starting analysis & motor on load analysis.
- Fault level at parallel operation of 2 grid incomers (synchronization check) as applicable for each site.
- Fault level at parallel operation during Sync bypass from VFD to DOL operation as applicable for each site.
- Fault level analysis and its recommendations along with assisting in implementation of recommendation through virtual or telephonic mode. However, BPCL may call upon the party to visit the site on paid visit for post recommendation updation on BPCL discretion.
- Software Simulation & study of starting motor operation on VFD, DOL, Sync Bypass, HT DG set independently serving load, starting of highest capacity motor fed through different feeder.
- Carry out relay coordination for HT/LT loads and HT/LT generators and Incomers.
- Determination of fault level (3-phase and single line to ground) and creating a comparison with existing system fault level and recommendatory design analysis.
- Transient analysis and Grid Islanding scheme.
- Study shall be carried out up to 415V PCC level.
- Providing as-and-when-required technical assistance without any extra charge till 3 months to observe implementation of relay settings, through virtual or telephonic mode. However, BPCL may call upon the party to visit the site on paid visit for post recommendation updation on BPCL discretion.
- Identifying shortfalls of existing electrical system; studying protection adequacy; reviewing SLD and existing settings; providing recommendations.

3.5 Software Requirement

All studies shall be carried out in ETAP software or equivalent and reports shall form part of the report. Field data collected shall be submitted along with the report as RAW data.

Detailed presentation of the study shall be given by the Consultant to BPCL on the findings of the study. Minimum 2 presentations shall be considered- One after submission of the preliminary report and another after submission of the final report.

3.6 Data Analysis & Reports

Pipelines has introduced new digital platform PipelineOne, Digital Data Format for Pipeline One Integration, vendor shall submit the data in same for ease in data integration to portal.

For the Relay Testing Report, the report shall mandatorily have the following details:

- Plant and Location (Panel number).

- Name plate details of the relay.
- Competency certificate of the testing engineer enclosed with every report.
- Location specific summary of Relay healthiness
- **Online / Offline Presentation pre and post job execution to be provided yearly, suggesting the methodology of testing, execution plan, communication matrix, results of finding for each location and prior to finalization of relay report**
- Clear remark regarding the healthiness/faultiness of the particular relay.
- Testing equipment details and their Instrument Proving certificate enclosed with every report.

Apart from the above, all parameters of the tested relay shall form part of the report including:

- Service settings and secondary injection simulation.
- Coil resistance, coil pick-up and drop-off time.
- Auxiliary DC unit operation check.
- Thermal and Pre-trip alarm unit check.
- Stalling protection unit check.
- Instantaneous overcurrent unit check.
- Negative sequence unit check and earth fault protection unit check.
- General check-up: physical damage, wiring check, LED indication, relay connections/tightness, flag operation, trip isolating contacts, cleaning and pressure of relay contacts, continuity of plug shorting bridge contacts.
- BPCL will be implementing centralized software Pipeline One; submission of reports shall be in BPCL format in Excel/Word as prescribed by BPCL EIC.
- Final report shall be prepared after prior discussions, finalization and approval from BPCL. It may take a number of revisions based on accuracy of data.
- Vendor has to submit reports of the relay testing (3 copies) supported by reports generated at site, countersigned by BPCL officers.

SECTION 02 – SPECIAL CONDITIONS OF CONTRACT

1. GENERAL INFORMATION

- 1.1. The "Special Conditions of Contract [SCC]" shall be read in conjunction with the "General Conditions of Contract [GCC]", "Schedule of Rates [SOR]", "Scope of Work" and any other document forming part of the Contract, wherever the context so requires.
- 1.2. Notwithstanding the sub-divisions of the documents into separate sections, each part shall be deemed to be supplementary of every other part and shall be read with and into the Contract so far as it may be practicable to do so.
- 1.3. Where any portion of the "GCC" is repugnant to or at variance with any provisions of the "SCC", the provisions of the "SCC" shall prevail. In case of any contradiction, the decision of the "Engineer-in-Charge [EIC]" will be final and binding on the contractor.
- 1.4. The contractor shall deploy diligent, experienced, smart, intelligent and hard-working persons in the skilled and semi-skilled categories as required.
- 1.5. Contractor shall not be entitled to sub-let, subcontract or assign the work without BPCL consent in writing.

2. SCOPE OF SUPPLY & WORKS OF CONTRACTOR

- 2.1. All instruments (with Instrument Proving reports prior to mobilization at site), all necessary other equipment and accessories, cables, tools-tackles, materials, current injector kits required for testing/study, and any consumables, required teams consisting of skilled and experienced manpower etc., shall be arranged by the contractor without any extra charge. The scope includes but is not limited to:
 - Relay testing
 - System Study along with relay coordination study
 - Preparation and submission of presentations and reports
- 2.2. The contractor shall arrange photo gate passes/labor permissions/vehicle passes etc. for his persons/labors/vehicles at his own cost.
- 2.3. The contractor shall make his own arrangement/approach road for transportation of labour, material, machinery etc. at the actual work place without any extra cost to BPCL.
- 2.4. For the System Study- All expenses towards mobilization and demobilization including bringing in equipment, workforce, materials, dismantling equipment, clearing the site etc. shall be deemed to be included in the prices quoted.
- 2.5. For the Relay Testing- All expenses towards bringing in equipment, workforce, materials, etc. shall be deemed to be included in the prices quoted. Mob/demob charges shall not be paid for locations which are clubbed with other major locations.

3. SCOPE OF SUPPLY & WORKS OF BPCL

BPCL will arrange for necessary work permits.

4. CONTRACTUAL COMPLETION PERIOD

Time is the essence of this contract. Contract period shall be **36 Months** from the date of Letter of Acceptance / Purchase Order / Contract, whichever is earlier. The Contract shall be completed in all respects including mobilization, execution, and submission of final report & acceptance within the contract period.

Timeframe for execution of job at site:

Sr. No.	Details of Job	Execution Period
1	System study with on-site visit for data collection, creation of panel wise setting report actual vs recommendation based on analysis along with submission of recommendation, implementation of recommendation on updated protection settings	Within 3 months from the date of Purchase Order
2	Relay Testing along with presentations and submission of final report at site	Within 4 weeks from the date of Purchase Order

Sr No	Pipeline	Location	State	System Study & Relay Coordination (One-time)	Tentative Quarter to Start the Study*
1	MMBPL	Mumbai, Washala	Maharashtra	Required	Q2 CY 2028
2	MMBPL	Manmad	Maharashtra	Required	Q4 CY 2027
3	MMBPL	Sanghavi	Maharashtra	Required	Q4 CY 2027
4	MMBPL	Gujari	Madhya Pradesh	Required	Q1 CY 2027
5	MMBPL	Mangliya	Madhya Pradesh	Required	Q1 CY 2027
6	MMBPL/BKPL/KJPL/BPPL	Kota	Rajasthan	Required	Q1 CY 2027
7	MMBPL	Malarna	Rajasthan	Required	Q2 CY 2027
8	MMBPL/PJPL*	Piyala	Haryana	Required	Q1 CY 2027
9	MMBPL	Bharatpur	Rajasthan	Required	Q2 CY 2027
10	BPPL/BKPL/VBPL	Bina	Madhya Pradesh	Required	Q2 CY 2027
11	VBPL	Thamna	Gujarat	Required	Q1 CY 2027
12	VBPL	Bawdi	Madhya Pradesh	Required	Q1 CY 2027
13	CCKPL	Cochin	Kerala	Required	Q1 CY 2027

* This is tentative schedule and may change (prepone / postpone) depending on actual site availability.

LD clause shall be applicable as per the condition mentioned in the attached GCC in case the execution period crosses the time frame specified above.

6. PAYMENT TERMS

100% payment will be made after completion of testing, a location-specific Online/In-person presentation and submission of report location-wise and due certification by Engineer-in-Charge at every location.

7. LOCATION DETAILS

Location	Address
Mumbai	BPCL Refinery, Mahul, Chembur, Mumbai, Maharashtra
Washala	Kasara, Thane, Maharashtra
Manmad	Panewadi, Manmad, Maharashtra
Sanghvi	Sanghvi, Dhule, Maharashtra
Gujri	Gujri, Maheshwar, Khargone, Madhya Pradesh
Manglya	Indore, Madhya Pradesh
IP-1 Sherpur	Sherpur, Pidawa, Jhalawar, Rajasthan
Kota	Ladpura, Kota, Rajasthan
Malarna	Malarna, Sawaimadhopur, Rajasthan
Karwadi	Bayana, Bharatpur, Rajasthan
Bharatpur	Dhormuei, Bharatpur, Rajasthan
Mathura	Mathura, Uttar Pradesh
Piyala	Faridabad, Haryana
Bina	Bina, Sagar, Madhya Pradesh
Uran	Uran, Navi Mumbai, Raigad, Maharashtra
Jobner	Phulera (Sambhar), Jaipur, Rajasthan
Kochi	Irimpanam, Kochi, Kerala
Vadinar	Vadinar, Jamnagar, Gujarat
Thamna	Umreth, Anand, Gujarat
Bawdi	Petlawad, Jhabua, Madhya Pradesh
Krishnapatnam	Krishnapatnam Dispatch Terminal, Mutukur, Nellore, AP
KHPL-IP01	Vallur P.O., Near Naidupalem Village, Prakasam, Ongole, AP
KHPL-IP02	Rompicherla, Palnadu, AP
KHPL-IP03	Ulsayapalem, Adavidevulapalli, Nalgonda, Telangana
Malkapur	Phase-2, Yadadri Bhuvanagiri, Malkapur, Telangana
Rasayani	Parade/Dapiwali, Rasayani, Khalapur/Panvel, Raigad, MH
Jewar	Jewar, Gautam Buddha Nagar district, Uttar Pradesh

ANNEXURE – RELAY DETAILS

Detailed relay and meter details for each pipeline location are to be provided separately as per site-specific data furnished by BPCL. The annexure shall include:

- List of type of relay, station-wise.
- Single Line Diagrams (SLDs) for stations where system study is to be carried out.

Details of Relays for 3 years:

SR. NO.	PIPELINE	LOCATION	RELAY TYPE	PROTECTION TYPE (SLD REF)	QTY
1	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,74TCS	1
2	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2
3	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,74TCS	1
4	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2
5	KHPL	KRISHNAPATNAM	NUMERICAL	50,50G,50N,50AFD,51,51N,74TCS	1
6	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
7	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,51,51G,51N,74TCS	1
8	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2
9	KHPL	KRISHNAPATNAM	NUMERICAL	27,50,50G,50N,50AFD,51,51N,74TCS	1
10	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
11	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,74TCS	1
12	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2
13	KHPL	KRISHNAPATNAM	NUMERICAL	27,50,50N,50AFD,51,51N,59N,74TCS	1
14	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
15	KHPL	KRISHNAPATNAM	NUMERICAL	27,50,50N,50AFD,51,51N,59,74TCS,64R	2
16	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
17	KHPL	KRISHNAPATNAM	NUMERICAL	27	1
18	KHPL	KRISHNAPATNAM	NUMERICAL	27	1
19	KHPL	KRISHNAPATNAM	NUMERICAL	50,50N,51,51N,50AFD,27,74TCS	1
20	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
21	KHPL	KRISHNAPATNAM	NUMERICAL	27	1
22	KHPL	KRISHNAPATNAM	NUMERICAL	27,50,50N,50AFD,51,51N,59,74TCS,64R	2
23	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
24	KHPL	KRISHNAPATNAM	NUMERICAL	27	1
25	KHPL	KRISHNAPATNAM	NUMERICAL	27,50,50N,50AFD,51,51N,59N,74TCS	1
26	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
27	KHPL	KRISHNAPATNAM	NUMERICAL	27,50,50G,50N,50AFD,51,51N,74TCS	1
28	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	1
29	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,74TCS	1
30	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2
31	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,74TCS	1
32	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2
33	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,74TCS	1
34	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2
35	KHPL	KRISHNAPATNAM	NUMERICAL	14,27,46,48,49M,66,50,50G,50N,50AFD,74TCS	1
36	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	2

37	KHPL	KRISHNAPATNAM	NUMERICAL	27,59	3
38	KHPL	KRISHNAPATNAM	NUMERICAL	50AFD	8
39	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	8
40	KHPL	KRISHNAPATNAM	NUMERICAL	50,50N,51,51N,50AFD,27,50G,51G,74TCS	2
41	KHPL	KRISHNAPATNAM	NUMERICAL	27,59	2
42	KHPL	KRISHNAPATNAM	ELECTRO MECH.	VAA	8
43	KHPL	KRISHNAPATNAM	NUMERICAL	87L	2
44	KHPL	KRISHNAPATNAM	ELECTRO MECH.	VAJ	2
45	KHPL	KRISHNAPATNAM	ELECTRO MECH.	VAA AC DC FAIL RELAY	7
46	KHPL	KRISHNAPATNAM	NUMERICAL	50,50N,51,51N,50AFD,74TCS	5
47	KHPL	KRISHNAPATNAM	NUMERICAL	87L	4
48	KHPL	KRISHNAPATNAM	NUMERICAL	27,59	2
49	KHPL	KRISHNAPATNAM	NUMERICAL	51,50,51N,50N,51G,27	1
50	KHPL	KRISHNAPATNAM	NUMERICAL	51,50,51N,50N	1
51	KHPL	KRISHNAPATNAM	NUMERICAL	51,50,51N,50N,51G,27	1
52	KHPL	KRISHNAPATNAM	NUMERICAL	51,50,51N,51N	1
53	KHPL	KRISHNAPATNAM	NUMERICAL	51,50,51N,50N,27	1
54	KHPL	KRISHNAPATNAM	ELECTRO MECH.	TRIPPING RELAY VAJ	5
55	KHPL	KRISHNAPATNAM	ELECTRO MECH.	AC-DC SUPERVISION RELAY	1
56	KHPL	ONGOLE-IP1	NUMERICAL	51,50,51N,50N,51G,27	1
57	KHPL	ONGOLE-IP1	NUMERICAL	51,50,51N,51N	1
58	KHPL	ONGOLE-IP1	NUMERICAL	51,50,51N,50N,27	1
59	KHPL	ONGOLE-IP1	NUMERICAL	51,50,51N,50N,51G,27	1
60	KHPL	ONGOLE-IP1	ELECTRO MECH.	TRIPPING RELAY VAJ	4
61	KHPL	KHPL-IP2	NUMERICAL	51,50,51N,50N,51G,27	1
62	KHPL	KHPL-IP2	NUMERICAL	51,50,51N,51N	1
63	KHPL	KHPL-IP2	NUMERICAL	51,50,51N,50N,27	1
64	KHPL	KHPL-IP2	NUMERICAL	51,50,51N,50N,51G,27	1
65	KHPL	KHPL-IP2	ELECTRO MECH.	TRIPPING RELAY VAJ	4
66	KHPL	KHPL-IP2	NUMERICAL	51,51N,50,50N	1
67	KHPL	KHPL-IP2	NUMERICAL	27,59	1
68	KHPL	KHPL-IP2	ELECTRO MECH.	VAA	4
69	KHPL	KHPL-IP2	ELECTRO MECH.	TRIPPING RELAY VAJ	1
70	KHPL	KHPL-IP2	ELECTRO MECH.	AC-DC SUPERVISION RELAY	1
71	KHPL	KHPL-IP3	NUMERICAL	51,50,51N,50N,51G,27	1
72	KHPL	KHPL-IP3	NUMERICAL	51,50,51N,51N	1
73	KHPL	KHPL-IP3	NUMERICAL	51,50,51N,50N,27	1
74	KHPL	KHPL-IP3	NUMERICAL	51,50,51N,50N,51G,27	1
75	KHPL	KHPL-IP3	ELECTRO MECH.	TRIPPING RELAY VAJ	4
76	KHPL	KHPL-IP3	NUMERICAL	51,51N,50,50N	1
77	KHPL	KHPL-IP3	NUMERICAL	27,59	1

78	KHPL	KHPL-IP3	ELECTRO MECH.	VAA	4
79	KHPL	KHPL-IP3	ELECTRO MECH.	TRIPPING RELAY VAJ	1
80	KHPL	KHPL-IP3	ELECTRO MECH.	AC-DC SUPERVISION RELAY	1
81	KHPL	MALKAPUR	NUMERICAL	50,50G,46M,49M,27,PHASE REVERSAL AND MOTOR START SUP	3
82	KHPL	MALKAPUR	NUMERICAL	50,51,50N,51N,51G,27	1
83	KHPL	MALKAPUR	NUMERICAL	50,51,50N,51N,51G	1
84	KHPL	MALKAPUR	NUMERICAL	50,51,50N,51N,51G,27	1
85	BKPL	BKPL-BINA	NUMERICAL	P3U30 FEEDER PROTECTION	16
86	BKPL	BKPL-BINA	NUMERICAL	P3U30 MOTOR PROTECTION RELAY	2
87	BKPL	BKPL-BINA	ELECTRO MECH.	VAJH13 TRIP RELAY	15
88	BKPL	BKPL-BINA	ELECTRO MECH.	VAJHM23 TRIP RELAY	3
89	BKPL	BKPL-BINA	NUMERICAL	MICOM P211 MOTOR PROTECTION RELAY	1
90	BKPL	BKPL-BINA	ELECTRO MECH.	CDG61 O/C AND E/F	1
91	BKPL	BKPL-BINA	ELECTRO MECH.	VAG11 UNDER VOLTAGE RELAY	2
92	BKPL	BKPL-BINA	ELECTRO MECH.	VTT11 DEFINITE TIME RELAY	4
93	BKPL	BKPL-BINA	ELECTRO MECH.	VDG11 OVER VOLTAGE RELAY	8
94	BKPL	BKPL-BINA	ELECTRO MECH.	VDG13 UNDER VOLTAGE RELAY	4
95	BKPL	BKPL-BINA	ELECTRO MECH.	VAA33 AUXILIARY RELAY	3
96	BKPL	BKPL-BINA	ELECTRO MECH.	VAX31 TRIP CIRCUIT SUPERVISION RELAY	5
97	VBPL	CRT-BINA	ELECTRO MECH.	CTUM15 SENSITIVE EARTH FAULT RELAY	3
98	VBPL	CRT-BINA	ELECTRO MECH.	VAJ TRIPPING RELAY	1
99	VBPL	CRT-BINA	ELECTRO MECH.	VTT11 DEFINITE TIME RELAY	4
100	VBPL	CRT-BINA	ELECTRO MECH.	VAGM22 INSTANTANEOUS UNDER VOLTAGE	4
101	VBPL	CRT-BINA	ELECTRO MECH.	VDG11 OVER VOLTAGE RELAY	2
102	VBPL	CRT-BINA	ELECTRO MECH.	CAG14 INSTANTANEOUS EARTH FAULT	1
103	VBPL	CRT-BINA	ELECTRO MECH.	VDG13 UNDER VOLTAGE RELAY	1
104	VBPL	CRT-BINA	ELECTRO MECH.	2ALO-10-323 SINGLE PHASING/UNBALANCE TRIP ; PHASE REVERSE; UV/OV	3
105	BPPL	BPPL-BINA	NUMERICAL	REF-615E-1G FEEDER PROTECTION	13
106	BPPL	BPPL-BINA	NUMERICAL	REM615E-1G MOTOR PROTECTION RELAY	5
107	BPPL	BPPL-BINA	NUMERICAL	REF615E-1G MOTOR DIFFERENTIAL RELAY	2
108	BPPL	BPPL-BINA	NUMERICAL	P3F30 FEEDER PROTECTION	4
109	BPPL	BPPL-BINA	NUMERICAL	P3U30 FEEDER PROTECTION	2
110	BPPL	BPPL-BINA	NUMERICAL	1MYN569697-E TRIP CIRCUIT SUPERVISION RELAY	11
111	BPPL	BPPL-BINA	NUMERICAL	PQ8NCH2J LOCKOUT RELAY	9
112	BPPL	BPPL-BINA	NUMERICAL	PQ5NCH2J LOCKOUT RELAY	13
113	BPPL	BPPL-BINA	NUMERICAL	SIPROTEC 7SD61 LINE DIFFERENTIAL RELAY	2

114	BPPL	BPPL-BINA	NUMERICAL	LVM LINE VOLTAGE MONITOR UV/OV	3
115	BPPL	BPPL-BINA	NUMERICAL	7PJ13 TRIP CIRCUIT SUPERVISION RELAY	1
116	BPPL	BPPL-BINA	NUMERICAL	CV2D2J AUXILIARY RELAY - 1MYN563627-DBB	6
117	BPPL	BKPL-IP GUNA	NUMERICAL	P3U30 FEEDER PROTECTION	5
118	BPPL	BKPL-IP GUNA	ELECTRO MECH.	VAJHM23 TRIP RELAY	1
119	BPPL	BKPL-IP GUNA	ELECTRO MECH.	VAA11 AUXILIARY RELAY	1
120	BPPL	BKPL-IP GUNA	ELECTRO MECH.	VAA13 AUXILIARY RELAY	1
121	BPPL	BKPL-IP GUNA	ELECTRO MECH.	VAA33 AUXILIARY RELAY	1
122	BPPL	BKPL-IP GUNA	ELECTRO MECH.	VTT11 DEFINITE TIME RELAY	1
123	MMBPL	BHARATPUR	NUMERICAL	P3U30 FEEDER PROTECTION	22
124	MMBPL	BHARATPUR	NUMERICAL	P3644 87T TRANSFORMER DIFFERENTIAL PROTECTION & SEF PROTECTION	2
125	MMBPL	BHARATPUR	NUMERICAL	P3U30 64R RESTRICTED EARTH FAULT PROTECTION	2
126	MMBPL	BHARATPUR	ELECTRO MECH.	VAJH13 TRIP RELAY	13
127	MMBPL	BHARATPUR	ELECTRO MECH.	VAJHM23 TRIP RELAY	10
128	MMBPL	BHARATPUR	ELECTRO MECH.	VAX31 TRIP CIRCUIT SUPERVISION RELAY	5
129	MMBPL	BHARATPUR	ELECTRO MECH.	CTUM15 SENSITIVE EARTH FAULT RELAY	7
130	MMBPL	BHARATPUR	ELECTRO MECH.	VDG11 OVER VOLTAGE RELAY	2
131	MMBPL	BHARATPUR	ELECTRO MECH.	VDG13 UNDER VOLTAGE RELAY	2
132	MMBPL	BHARATPUR	ELECTRO MECH.	VTT 12 DEFINITE TIME RELAY	2
133	MMBPL	KARWADI IP-04	ELECTRO MECH.	CAG14 INSTANTANEOUS EARTH FAULT	2
134	MMBPL	KARWADI IP-04	ELECTRO MECH.	VAGM22 INSTANTANEOUS UNDER VOLTAGE	6
135	MMBPL	KARWADI IP-04	ELECTRO MECH.	VTT11 DEFINITE TIME RELAY	6
136	MMBPL	KARWADI IP-04	ELECTRO MECH.	CTN31 NEGATIVE PHASE SEQUENCE CURRENT RELAY	1
137	MMBPL	KARWADI IP-04	ELECTRO MECH.	VAJH13 TRIP RELAY	3
138	MMBPL	KARWADI IP-04	ELECTRO MECH.	SKE11 SYNCHRO-CHECK RELAY	1
139	MMBPL	KARWADI IP-04	ELECTRO MECH.	VAA33 AUXILIARY RELAY	2
140	MMBPL	KARWADI IP-04	ELECTRO MECH.	CDG13 EARTH FAULT RELAY	1
141	MMBPL	KARWADI IP-04	ELECTRO MECH.	VDG11 OVER VOLTAGE RELAY	3
142	MMBPL	KARWADI IP-04	ELECTRO MECH.	CTUM15 SENSITIVE EARTH FAULT RELAY	1
143	MMBPL	KARWADI IP-04	ELECTRO MECH.	VDG13 UNDER VOLTAGE RELAY	1
144	MMBPL	PIYALA	NUMERICAL	P5T30 87T TRANSFORMER DIFFERENTIAL & FEEDER PROTECTION RELAY	1
145	MMBPL	PIYALA	NUMERICAL	P3U30 FEEDER PROTECTION	20
146	MMBPL	PIYALA	NUMERICAL	P3U30 MOTOR PROTECTION	2
147	MMBPL	PIYALA	NUMERICAL	P3U30 GENERATOR DIFFERENTIAL PROTECTION	1
148	MMBPL	PIYALA	NUMERICAL	SIEMENS SIPROTECH 7UM61 GENERATOR PROTECTION RELAY	1

149	MMBPL	PIYALA	NUMERICAL	MICOM P225 MOTOR PROTECTION RELAY	1
150	MMBPL	PIYALA	NUMERICAL	SIEMENS 7SR1206 SOLAR FEEDER PROTECTION RELAY	1
151	PJPL	PIYALA	NUMERICAL	PROCOM COP-ADV-412 FEEDER PROTECTION RELAY	6
152	PJPL	JEWAR	NUMERICAL	PROCOM COP-ADV-412 FEEDER PROTECTION RELAY	2
153	MMBPL	PIYALA	ELECTRO MECH.	VAJH13 TRIP RELAY	22
154	MMBPL	PIYALA	ELECTRO MECH.	VAJH23 TRIP RELAY	3
155	MMBPL	PIYALA	ELECTRO MECH.	VAX31 TRIP CIRCUIT SUPERVISION RELAY	4
156	MMBPL	PIYALA	ELECTRO MECH.	CCUM21 DEFINITE TIME REVERSE POWER RELAY	1
157	MMBPL	PIYALA	ELECTRO MECH.	YCGF11 FIELD FAILURE RELAY	1
158	MMBPL	PIYALA	ELECTRO MECH.	VTT11 DEFINITE TIME RELAY	2
159	MMBPL	PIYALA	ELECTRO MECH.	CTN31 NEGATIVE PHASE SEQUENCE CURRENT RELAY	2
160	MMBPL	PIYALA	ELECTRO MECH.	CTUM15 SENSITIVE EARTH FAULT RELAY	5
161	MMBPL	PIYALA	ELECTRO MECH.	VAG11 TRIP RELAY	4
162	MMBPL	MATHURA	NUMERICAL	P3U30 FEEDER PROTECTION	2
163	MMBPL	MATHURA	ELECTRO MECH.	CTN31 NEGATIVE PHASE SEQUENCE CURRENT RELAY	1
164	MMBPL	MATHURA	ELECTRO MECH.	VAJH13 TRIP RELAY	2
165	MMBPL	MATHURA	ELECTRO MECH.	CTUM15 SENSITIVE EARTH FAULT RELAY	1
166	MMBPL	MATHURA	ELECTRO MECH.	VTT12 DEFINITE TIME RELAY	1
167	MMBPL	MATHURA	ELECTRO MECH.	VDG11 OVER-VOLTAGE RELAY	1
168	MMBPL	MATHURA	ELECTRO MECH.	VDG13 UNDER-VOLTAGE RELAY	1
169	MMBPL	BIJWASAN	NUMERICAL	P3U30 FEEDER PROTECTION	2
170	MMBPL	BIJWASAN	ELECTRO MECH.	CTN31 NEGATIVE PHASE SEQUENCE CURRENT RELAY	1
171	MMBPL	BIJWASAN	ELECTRO MECH.	VAJH13 TRIP RELAY	2
172	MMBPL	BIJWASAN	ELECTRO MECH.	CTUM15 SENSITIVE EARTH FAULT RELAY	1
173	MMBPL	BIJWASAN	ELECTRO MECH.	VTT12 DEFINITE TIME RELAY	1
174	MMBPL	BIJWASAN	ELECTRO MECH.	VDG11 OVER-VOLTAGE RELAY	1
175	MMBPL	BIJWASAN	ELECTRO MECH.	VDG13 UNDER-VOLTAGE RELAY	1
176	BPPL	PANKI	NUMERICAL	MICOM P127 FEEDER PROTECTION RELAY	1
177	BPPL	PANKI	NUMERICAL	P3U30 FEEDER PROTECTION	1
178	BPPL	PANKI	ELECTRO MECH.	PQ8NCH2J TRIP RELAY	4
179	BPPL	PANKI	ELECTRO MECH.	1MYN569697-E TRIP CIRCUIT SUPERVISION RELAY	3
180	BPPL	PANKI	NUMERICAL	P3F30-CGGGI-AA1NA-BBAAA FEEDER PROTECTION	2
181	BPPL	PANKI	NUMERICAL	P3U30 UNDER/OVER VOLTAGE PROTECTION RELAY	1
182	BPPL	PANKI	NUMERICAL	LVM 11 AC VOLTAGE RELAY- UV/OV	2
183	BPPL	PANKI	ELECTRO MECH.	CV2A2J TRANSFORMER PROTECTION RELAY	4

184	BPPL	IP-01 MAHEBA	ELECTRO MECH.	PQ8NCH2J TRIP RELAY	1
185	BPPL	IP-01 MAHEBA	ELECTRO MECH.	1MYN569697-G TRIP CIRCUIT SUPERVISION RELAY	1
186	BPPL	IP-01 MAHEBA	NUMERICAL	MICOM P127 FEEDER PROTECTION RELAY	1
187	BPPL	IP-01 MAHEBA	ELECTRO MECH.	CV2A2J TRANSFORMER PROTECTION RELAY	4
188	BPPL	IP-01 MAHEBA	NUMERICAL	LVM 11 AC VOLTAGE RELAY- UV/OV	4
189	BPPL	IP-01 MAHEBA	NUMERICAL	7SR1004-3LA20-2CA0/EE OVER CURRENT EARTH FAULT RELAY	2
190	MMBPL	IP01- SHERPUR	ELECTRO MECH.	SKE11	1
191	MMBPL	IP01- SHERPUR	ELECTRO MECH.	CAG14	3
192	MMBPL	IP01- SHERPUR	ELECTRO MECH.	VTT11	4
193	MMBPL	IP01- SHERPUR	ELECTRO MECH.	VAG11	3
194	MMBPL	IP01- SHERPUR	ELECTRO MECH.	CTUM15	4
195	MMBPL	IP01- SHERPUR	ELECTRO MECH.	VDG11	2
196	MMBPL	IP01- SHERPUR	ELECTRO MECH.	VAJH13	3
197	MMBPL	IP01- SHERPUR	ELECTRO MECH.	VAGM22	6
198	MMBPL	IP01- SHERPUR	ELECTRO MECH.	VAA33	2
199	MMBPL	IP01- SHERPUR	ELECTRO MECH.	CDG13	1
200	MMBPL	IP01- SHERPUR	ELECTRO MECH.	VDG13	1
201	KJPL	JOBNER	ELECTRO MECH.	VTT11	4
202	KJPL	JOBNER	ELECTRO MECH.	VAG11	8
203	MMBPL	KOTA	ELECTRO MECH.	DEFINITE TIME RELAY TYPE VTT	9
204	MMBPL	KOTA	ELECTRO MECH.	INSTANTANEOUS EARTH FAULT RELAY TYPE CAG	2
205	MMBPL	KOTA	ELECTRO MECH.	OVER VOLTAGE RELAY TYPE VOLTAGE VDG	6
206	MMBPL	KOTA	ELECTRO MECH.	INSTANTANEOUS UNDER VOLTAGE TYPE VAGM	6
207	MMBPL	KOTA	ELECTRO MECH.	EARTH FAULT {VERY INV} TYPE CDG	1
208	MMBPL	KOTA	ELECTRO MECH.	AUXILARY RELAY TYPE VAA	2
209	MMBPL	KOTA	ELECTRO MECH.	CHECK SYNCHRONISING RELAY TYPE SKE	2
210	MMBPL	KOTA	ELECTRO MECH.	SENSITIVE EARTH FAULT RELAY CTUM	4
211	MMBPL	KOTA	ELECTRO MECH.	TRIPPING RELAY TYPE VAJ	17
212	MMBPL	KOTA	ELECTRO MECH.	UNDER VOLTAGE TYPE VDG	2
213	MMBPL	KOTA	ELECTRO MECH.	NO VOLTAGE RELAY TYPE VAG	3
214	MMBPL	KOTA	ELECTRO MECH.	OVER VOLTAGE RELAY TYPE VAG	1
215	MMBPL	KOTA	ELECTRO MECH.	UNDER VOLTAGE RELAY TYPE VAG	4

216	MMBPL	KOTA	ELECTRO MECH.	OVER CURRENT-EARTH FAULT RELAY (VERY INVERSE) TYPE CDG	2
217	MMBPL	KOTA	ELECTRO MECH.	TRIP CIRCUIT SUPERVISION RELAY TYPE VAX MK.11	9
218	MMBPL	KOTA	ELECTRO MECH.	EARTH FAULT RELAY (INVERSE) TYPE CDG	4
219	MMBPL	KOTA	NUMERICAL	P3U30 6AAA2BBAA	20
220	MMBPL	KOTA	NUMERICAL	MICOM P643	2
221	MMBPL	MALARNA	ELECTRO MECH.	VAJH13	12
222	MMBPL	MALARNA	ELECTRO MECH.	VAJHM23	8
223	MMBPL	MALARNA	ELECTRO MECH.	VAX31	5
224	MMBPL	MALARNA	ELECTRO MECH.	CTUM15	10
225	MMBPL	MALARNA	NUMERICAL	P3U30 6AAA2BBAA	23
226	MMBPL	MALARNA	NUMERICAL	MICOM P643	2
227	MMBPL	MANGLIYA	NUMERICAL	P3U30 6AAA2BBAA	23
228	MMBPL	MANGLIYA	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	19
229	MMBPL	MANGLIYA	ELECTRO MECH.	TRIP CIRCUIT SUPERVISION RELAY - TYPE VAX	4
230	MMBPL	MANGLIYA	ELECTRO MECH.	NO VOLTAGE RELAY - TYPE VAG	2
231	MMBPL	MANGLIYA	ELECTRO MECH.	DEFINITE TIME RELAY	4
232	MMBPL	MANGLIYA	ELECTRO MECH.	SENSITIVE EARTH FAULT RELAY - TYPE CTUM	4
233	MMBPL	MANGLIYA	ELECTRO MECH.	INSTANTANEOUS EARTH FAULT RELAY	2
234	MMBPL	MANGLIYA	ELECTRO MECH.	INSTANTANEOUS UNDERVOLTAGE RELAY	2
235	MMBPL	MANGLIYA	ELECTRO MECH.	UNDERVOLTAGE RELAY	1
236	MMBPL	MANGLIYA	ELECTRO MECH.	OVERVOLTAGE RELAY	1
237	MMBPL	GUJARI	NUMERICAL	P3U30 6AAA2BBAA	15
238	MMBPL	GUJARI	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	14
239	MMBPL	GUJARI	ELECTRO MECH.	TRIP CIRCUIT SUPERVISION RELAY - TYPE VAX	6
240	MMBPL	GUJARI	ELECTRO MECH.	NO VOLTAGE RELAY - TYPE VAG	2
241	MMBPL	GUJARI	ELECTRO MECH.	DEFINITE TIME RELAY - TYPE VTT	1
242	MMBPL	GUJARI	ELECTRO MECH.	UNDER VOLTAGE RELAY - TYPE VDG	1
243	MMBPL	GUJARI	ELECTRO MECH.	OVER VOLTAGE RELAY - TYPE VDG	2
244	MMBPL	GUJARI	ELECTRO MECH.	SENSITIVE EARTH FAULT RELAY - TYPE CTUM	4
245	MMBPL	GUJARI	ELECTRO MECH.	INSTANTANEOUS UNDER VOLTAGE RELAY - TYPE VAGM	2
246	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	UNDER VOLTAGE RELAY	1
247	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	TRPPING RELAY	1
248	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	DEFINITE TIME RELAY	3
249	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	OVER VOLTAGE RELAY	1

250	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	INSTANTANEOUS EARTH FAULT RELAY	1
251	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	INSTANTANEOUS UNDER VOLTAGE RELAY	1
252	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	UNDER VOLTAGE RELAY	22
253	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	OVER VOLTAGE RELAY	5
254	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	AUXILIARY RELAY	3
255	MMBPL	SV-JULWANIYA - 28	ELECTRO MECH.	SENSITIVE EARTH FAULT RELAY - TYPE CTUM	1
256	CCKPL	KOCHI	NUMERICAL	MOTOR, FEEDER & TRANSFORMER PROTECTION	27
257	CCKPL	KOCHI	NUMERICAL	TRANSFORMER DIFFERENTIAL	2
258	CCKPL	KOCHI	ELECTRO MECH.	DEFINITE TIME RELAY	1
259	CCKPL	KOCHI	ELECTRO MECH.	INSTANTANEOUS EARTH FAULT RELAY	1
260	CCKPL	KOCHI	ELECTRO MECH.	UNDER / OVER VOLTAGE RELAY	1
261	CCKPL	KOCHI	ELECTRO MECH.	AUXILIARY RELAY	10
262	CCKPL	KOCHI	ELECTRO MECH.	IDMTL OVER CURRENT RELAY	1
263	CCKPL	KOCHI	ELECTRO MECH.	COMBIFLEX	1
264	CCKPL	KOCHI	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	10
265	CCKPL	KOCHI	ELECTRO MECH.	TRIP CIRCUIT SUPERVISION RELAY - TYPE VAX	10
266	CCKPL	KOCHI	ELECTRO MECH.	CHECK SYNCH	1
267	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	CDG33	16
268	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VAJH13	26
269	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VAX31	24
270	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VAA33	22
271	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VAGM22	26
272	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	CDAG51E	2
273	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	CDAG53E	4
274	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	CDG13	4
275	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VDG11	2
276	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VDG14	2

277	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VAG11	4
278	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VAJH23	6
279	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VAA11	6
280	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	VTT11	4
281	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	HORM	12
282	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	CTUM15	4
283	MMBPL	MMBPL MDT MUMBAI, RASAYANI	NUMERICAL	MOTPRO - SCHNEIDER ELECTRIC MODEL P3U30 / P5M30	12
284	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	ABB PQ5NCH2J	4
285	MMBPL	MMBPL MDT MUMBAI, RASAYANI	ELECTRO MECH.	ABB 1MYN569697E	6
286	MUPL	MUPL MUMBAI	ELECTRO MECH.	VAJH	6
287	MUPL	MUPL MUMBAI	NUMERICAL	SIPROTECH	2
288	MUPL	MUPL MUMBAI	NUMERICAL	GE NUMERICAL	6
289	MUPL	MUPL MUMBAI	ELECTRO MECH.	CTUM (EARTHFAULT)	1
290	MUPL	MUPL URAN	ELECTRO MECH.	CDG33	1
291	MUPL	MUPL URAN	ELECTRO MECH.	VAG22	13
292	MUPL	MUPL URAN	ELECTRO MECH.	VAJH	1
293	MMBPL	MMBPL WIPS	ELECTRO MECH.	CDG33	8
294	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAJH13	13
295	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAX31	13
296	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAA33	15
297	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAGM22	13
298	MMBPL	MMBPL WIPS	ELECTRO MECH.	CDAG51E	1
299	MMBPL	MMBPL WIPS	ELECTRO MECH.	CDAG53E	5
300	MMBPL	MMBPL WIPS	ELECTRO MECH.	CDG13	4
301	MMBPL	MMBPL WIPS	ELECTRO MECH.	VDG11	2
302	MMBPL	MMBPL WIPS	ELECTRO MECH.	VDG14	2
303	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAG11	2
304	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAJH23	3

305	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAA11	9
306	MMBPL	MMBPL WIPS	ELECTRO MECH.	VTT11	3
307	MMBPL	MMBPL WIPS	ELECTRO MECH.	CTUM15	2
308	MMBPL	MMBPL WIPS	ELECTRO MECH.	ABB PQ5NCH2J	2
309	MMBPL	MMBPL WIPS	ELECTRO MECH.	ABB 1MYN569697E	3
310	MMBPL	MMBPL WIPS	NUMERICAL	MOTPRO - SCHNEIDER ELECTRIC MODEL P5M30	1
311	MMBPL	MMBPL WIPS	ELECTRO MECH.	DTH31	2
312	MMBPL	MMBPL WIPS	NUMERICAL	MOTPRO TYPE MCHNM01	2
313	MMBPL	MMBPL WIPS	ELECTRO MECH.	CAG34	3
314	MMBPL	MMBPL WIPS	ELECTRO MECH.	CAG14	2
315	MMBPL	MMBPL WIPS	ELECTRO MECH.	VAG21	6
316	MMBPL	MMBPL WIPS	ELECTRO MECH.	SKE11	2
317	MMBPL	MMBPL WIPS	ELECTRO MECH.	VTT12	2
318	MMBPL	MMBPL MANMAD	NUMERICAL	P3U30 6AAA2BBAA	31
319	MMBPL	MMBPL MANMAD	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	45
320	MMBPL	MMBPL MANMAD	ELECTRO MECH.	TRIP CIRCUIT SUPERVISION RELAY - TYPE VAX	22
321	MMBPL	MMBPL MANMAD	ELECTRO MECH.	NO VOLTAGE RELAY - TYPE VAG	25
322	MMBPL	MMBPL MANMAD	ELECTRO MECH.	DEFINITE TIME RELAY	12
323	MMBPL	MMBPL MANMAD	ELECTRO MECH.	SENSITIVE EARTH FAULT RELAY - TYPE CTUM	19
324	MMBPL	MMBPL MANMAD	ELECTRO MECH.	INSTANTANEOUS EARTH FAULT RELAY	9
325	MMBPL	MMBPL MANMAD	ELECTRO MECH.	INSTANTANEOUS UNDERVOLTAGE RELAY	12
326	MMBPL	MMBPL MANMAD	ELECTRO MECH.	OVERVOLTAGE RELAY	3
327	MMBPL	MMBPL SIPS	NUMERICAL	P3U30 6AAA2BBAA	16
328	MMBPL	MMBPL SIPS	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	16
329	MMBPL	MMBPL SIPS	ELECTRO MECH.	TRIP CIRCUIT SUPERVISION RELAY - TYPE VAX	10
330	MMBPL	MMBPL SIPS	ELECTRO MECH.	NO VOLTAGE RELAY - TYPE VAG	6
331	MMBPL	MMBPL SIPS	ELECTRO MECH.	"B37 NEUTRAL DISPLACEMENT RELAY"	1
332	MMBPL	MMBPL SIPS	ELECTRO MECH.	DIFFERENTIAL PROTECTION RELAY	3
333	MMBPL	MMBPL SIPS	ELECTRO MECH.	INSTANTANEOUS EARTH FAULT RELAY	3
334	MMBPL	MMBPL SIPS	ELECTRO MECH.	IDMT OVERCURRENT RELAY (INVERSE)	10
335	MMBPL	MMBPL SIPS	ELECTRO MECH.	IDMT . EARTH FAULT RELAY	8
336	MMBPL	MMBPL SIPS	ELECTRO MECH.	INST. EARTH FAULT RELAY	12
337	MMBPL	MMBPL SIPS	ELECTRO MECH.	OVERCURRENT RELAY (VERY INVERSE)	6

338	MMBPL	MMBPL SIPS	ELECTRO MECH.	VOLATGE SELECTION RELAY	3
339	MMBPL	MMBPL SIPS	ELECTRO MECH.	AUXILLARY RELAY	12
340	MMBPL	MMBPL SIPS	ELECTRO MECH.	DEFINITE TIME RELAY	13
341	VBPL	VADINAR	NUMERICAL	P3U30	49
342	VBPL	VADINAR	NUMERICAL	P5T30	2
343	VBPL	VADINAR	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	32
344	VBPL	VADINAR	ELECTRO MECH.	BUS DIFF.MULTI-PQ8NCH2J5	2
345	VBPL	VADINAR	ELECTRO MECH.	COMBIFLEX-RXIG22	10
346	VBPL	VADINAR	ELECTRO MECH.	ABB TRIPPING RELAY-P2BHC2JS	20
347	VBPL	VADINAR	ELECTRO MECH.	ABB TRIPPING RELAY -RXPSU 14 N	11
348	VBPL	VADINAR	ELECTRO MECH.	ABB RXTUG 22H 0751	2
349	VBPL	VADINAR	ELECTRO MECH.	ABB RTQTB 060	1
350	VBPL	VADINAR	ELECTRO MECH.	ABB RXDSB-4	1
351	VBPL	VADINAR	ELECTRO MECH.	ABB 86X RXMS-1 TRIPPING RELAY	10
352	VBPL	VADINAR	ELECTRO MECH.	ABB RXSU-2	1
353	VBPL	VADINAR	ELECTRO MECH.	ABB RXSGA-1	1
354	VBPL	VADINAR	ELECTRO MECH.	ABB RXME-1	2
355	VBPL	VADINAR	ELECTRO MECH.	ABB RXP8N	2
356	VBPL	VADINAR	ELECTRO MECH.	ABB RXNAA-4	1
357	VBPL	VADINAR	ELECTRO MECH.	ABB RXNAB 2H	1
358	VBPL	THAMNA	NUMERICAL	P3U30	17
359	VBPL	THAMNA	NUMERICAL	P5T30	1
360	VBPL	THAMNA	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	15
361	VBPL	THAMNA	ELECTRO MECH.	SENSITIVE EARTH FAULT RELAY - CTUM	1
362	VBPL	THAMNA	ELECTRO MECH.	TRIP CIRCUIT SUPERVISON RELAY-95	10
363	VBPL	BAWDI	NUMERICAL	P3U30	17
364	VBPL	BAWDI	NUMERICAL	P643	2
365	VBPL	BAWDI	ELECTRO MECH.	TRIPPING RELAY - TYPE VAJ	15

SECTION 03 – SCHEDULE OF QUANTITIES

The schedule of quantities for the contract shall be as follows:

RELAY TESTING, RELAY COORDINATION & SYSTEM STUDY

Sr. No.	ITEM NO.	SUB ITEM	LOCATION	DESCRIPTION	QTY	UNIT
1	10	10	Mumbai_MDT, Washala	Relay Coordination & System Study (On Requirement Basis)	2	LS
2		20	Mumbai_MDT, Washala	Additional visit for Technician (On Requirement Basis)	6	EA
3	20	10	Manmad	Relay Coordination & System Study (On Requirement Basis)	1	LS
4		20	Manmad	Additional visit for Technician (On Requirement Basis)	3	EA
5	30	10	Sanghavi	Relay Coordination & System Study (On Requirement Basis)	1	LS
6		20	Sanghavi	Additional visit for Technician (On Requirement Basis)	3	EA
7	40	10	Gujari	Relay Coordination & System Study (On Requirement Basis)	1	LS
8		20	Gujari	Additional visit for Technician (On Requirement Basis)	3	EA
9	50	10	Mangliya	Relay Coordination & System Study (On Requirement Basis)	1	LS
10		20	Mangliya	Additional visit for Technician (On Requirement Basis)	3	EA
11	60	10	Kota	Relay Coordination & System Study (On Requirement Basis)	1	LS
12		20	Kota	Additional visit for Technician (On Requirement Basis)	3	EA
13	70	10	Malarna	Relay Coordination & System Study (On Requirement Basis)	1	LS
14		20	Malarna	Additional visit for Technician (On Requirement Basis)	3	EA
15	80	10	Piyala	Relay Coordination & System Study (On Requirement Basis)	1	LS

16		20	Piyala	Additional visit for Technician (On Requirement Basis)	3	EA
15	90	10	BHARATPUR	Relay Coordination & System Study (On Requirement Basis)	1	LS
16		20	BHARATPUR	Additional visit for Technician (On Requirement Basis)	3	EA
17	100	10	Thamna	Relay Coordination & System Study (On Requirement Basis)	1	LS
18		20	Thamna	Additional visit for Technician (On Requirement Basis)	3	EA
19	110	10	Bawdi	Relay Coordination & System Study (On Requirement Basis)	1	LS
20		20	Bawdi	Additional visit for Technician (On Requirement Basis)	3	EA
21	120	10	Bina	Relay Coordination & System Study (On Requirement Basis)	1	LS
22		20	Bina	Additional visit for Technician (On Requirement Basis)	3	EA
23	130	10	Kochi	Relay Coordination & System Study (On Requirement Basis)	1	LS
24		20	Kochi	Additional visit for Technician (On Requirement Basis)	3	EA
25	140	10	MMBPL MDT Mumbai & Rasayani	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	94	NO
26		20	MMBPL MDT Mumbai & Rasayani	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	94	NO
27		30	MMBPL MDT Mumbai & Rasayani	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	188	NO
28	150	10	MMBPL MDT Mumbai & Rasayani	NUMERICAL RELAY TESTING_1ST YEAR	14	NO
29		20	MMBPL MDT Mumbai & Rasayani	NUMERICAL RELAY TESTING_2ND YEAR	14	NO
30		30	MMBPL MDT Mumbai & Rasayani	NUMERICAL RELAY TESTING_3RD YEAR	28	NO
31	160	10	WASHALA	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	117	NO

32		20	WASHALA	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	117	NO
33		30	WASHALA	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	117	NO
34	170	10	WASHALA	NUMERICAL RELAY TESTING_1ST YEAR	3	NO
35		20	WASHALA	NUMERICAL RELAY TESTING_2ND YEAR	3	NO
36		30	WASHALA	NUMERICAL RELAY TESTING_3RD YEAR	3	NO
37	180	10	MANMAD	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	147	NO
38		20	MANMAD	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	147	NO
39		30	MANMAD	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	147	NO
40	190	10	MANMAD	NUMERICAL RELAY TESTING_1ST YEAR	31	NO
41		20	MANMAD	NUMERICAL RELAY TESTING_2ND YEAR	31	NO
42		30	MANMAD	NUMERICAL RELAY TESTING_3RD YEAR	31	NO
43	200	10	SANGHAVI	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	103	NO
44		20	SANGHAVI	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	103	NO
45		30	SANGHAVI	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	103	NO
46	210	10	SANGHAVI	NUMERICAL RELAY TESTING_1ST YEAR	16	NO
47		20	SANGHAVI	NUMERICAL RELAY TESTING_2ND YEAR	16	NO
48		30	SANGHAVI	NUMERICAL RELAY TESTING_3RD YEAR	16	NO
49	220	10	GUJARI, JULWANIYA & SVs	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	71	NO
50		20	GUJARI, JULWANIYA & SVs	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	71	NO
51		30	GUJARI, JULWANIYA & SVs	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	71	NO
52	230	10	GUJARI, JULWANIYA & SVs	NUMERICAL RELAY TESTING_1ST YEAR	15	NO

53		20	GUJARI, JULWANIYA & SVs	NUMERICAL RELAY TESTING_2ND YEAR	15	NO
54		30	GUJARI, JULWANIYA & SVs	NUMERICAL RELAY TESTING_3RD YEAR	15	NO
55	240	10	MANGLIYA	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	39	NO
56		20	MANGLIYA	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	39	NO
57		30	MANGLIYA	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	39	NO
58	250	10	MANGLIYA	NUMERICAL RELAY TESTING_1ST YEAR	23	NO
59		20	MANGLIYA	NUMERICAL RELAY TESTING_2ND YEAR	23	NO
60		30	MANGLIYA	NUMERICAL RELAY TESTING_3RD YEAR	23	NO
61	260	10	KOTA & JOBNER	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	86	NO
62		20	KOTA & JOBNER	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	86	NO
63		30	KOTA & JOBNER	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	86	NO
64	270	10	KOTA & JOBNER	NUMERICAL RELAY TESTING_1ST YEAR	22	NO
65		20	KOTA & JOBNER	NUMERICAL RELAY TESTING_2ND YEAR	22	NO
66		30	KOTA & JOBNER	NUMERICAL RELAY TESTING_3RD YEAR	22	NO
67	280	10	MALARNA & SHERPUR	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	65	NO
68		20	MALARNA & SHERPUR	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	65	NO
69		30	MALARNA & SHERPUR	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	65	NO
70	290	10	MALARNA & SHERPUR	NUMERICAL RELAY TESTING_1ST YEAR	25	NO
71		20	MALARNA & SHERPUR	NUMERICAL RELAY TESTING_2ND YEAR	25	NO
72		30	MALARNA & SHERPUR	NUMERICAL RELAY TESTING_3RD YEAR	25	NO
73	300	10	BHARATPUR & KARWADI	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	68	NO

74		20	BHARATPUR & KARWADI	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	68	NO
75		30	BHARATPUR & KARWADI	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	68	NO
76	310	10	BHARATPUR & KARWADI	NUMERICAL RELAY TESTING_1ST YEAR	26	NO
77		20	BHARATPUR & KARWADI	NUMERICAL RELAY TESTING_2ND YEAR	26	NO
78		30	BHARATPUR & KARWADI	NUMERICAL RELAY TESTING_3RD YEAR	26	NO
79	320	10	MATHURA	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	7	NO
80		20	MATHURA	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	7	NO
81		30	MATHURA	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	7	NO
82	330	10	MATHURA	NUMERICAL RELAY TESTING_1ST YEAR	2	NO
83		20	MATHURA	NUMERICAL RELAY TESTING_2ND YEAR	2	NO
84		30	MATHURA	NUMERICAL RELAY TESTING_3RD YEAR	2	NO
85	340	10	PIYALA & JEWAR	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	44	NO
86		20	PIYALA & JEWAR	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	44	NO
87		30	PIYALA & JEWAR	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	44	NO
88	350	10	PIYALA & JEWAR	NUMERICAL RELAY TESTING_1ST YEAR	35	NO
89		20	PIYALA & JEWAR	NUMERICAL RELAY TESTING_2ND YEAR	35	NO
90		30	PIYALA & JEWAR	NUMERICAL RELAY TESTING_3RD YEAR	35	NO
91	360	10	BIJWASAN	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	7	NO
92		20	BIJWASAN	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	7	NO
93		30	BIJWASAN	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	7	NO
94	370	10	BIJWASAN	NUMERICAL RELAY TESTING_1ST YEAR	2	NO
95		20	BIJWASAN	NUMERICAL RELAY TESTING_2ND YEAR	2	NO

96		30	BIJWASAN	NUMERICAL RELAY TESTING_3RD YEAR	2	NO
97	380	10	BINA & GUNA	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	69	NO
98		20	BINA & GUNA	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	69	NO
99		30	BINA & GUNA	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	69	NO
100	390	10	BINA & GUNA	NUMERICAL RELAY TESTING_1ST YEAR	95	NO
101		20	BINA & GUNA	NUMERICAL RELAY TESTING_2ND YEAR	95	NO
102		30	BINA & GUNA	NUMERICAL RELAY TESTING_3RD YEAR	95	NO
103	400	10	VADINAR	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	97	NO
104		20	VADINAR	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	97	NO
105		30	VADINAR	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	97	NO
106	410	10	VADINAR	NUMERICAL RELAY TESTING_1ST YEAR	51	NO
107		20	VADINAR	NUMERICAL RELAY TESTING_2ND YEAR	51	NO
108		30	VADINAR	NUMERICAL RELAY TESTING_3RD YEAR	51	NO
109	420	10	THAMNA	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	26	NO
110		20	THAMNA	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	26	NO
111		30	THAMNA	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	26	NO
112	430	10	THAMNA	NUMERICAL RELAY TESTING_1ST YEAR	18	NO
113		20	THAMNA	NUMERICAL RELAY TESTING_2ND YEAR	18	NO
114		30	THAMNA	NUMERICAL RELAY TESTING_3RD YEAR	18	NO
115	440	10	BAWDI	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	25	NO
116		20	BAWDI	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	25	NO
117		30	BAWDI	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	25	NO

118	450	10	BAWDI	NUMERICAL RELAY TESTING_1ST YEAR	19	NO
119		20	BAWDI	NUMERICAL RELAY TESTING_2ND YEAR	19	NO
120		30	BAWDI	NUMERICAL RELAY TESTING_3RD YEAR	19	NO
121	460	10	KOCHI	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	34	NO
122		20	KOCHI	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	34	NO
123		30	KOCHI	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	34	NO
124	470	10	KOCHI	NUMERICAL RELAY TESTING_1ST YEAR	60	NO
125		20	KOCHI	NUMERICAL RELAY TESTING_2ND YEAR	60	NO
126		30	KOCHI	NUMERICAL RELAY TESTING_3RD YEAR	60	NO
127	480	10	COIMBATORE	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	1	NO
128		20	COIMBATORE	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	1	NO
129		30	COIMBATORE	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	1	NO
130	490	10	COIMBATORE	NUMERICAL RELAY TESTING_1ST YEAR	1	NO
131		20	COIMBATORE	NUMERICAL RELAY TESTING_2ND YEAR	1	NO
132		30	COIMBATORE	NUMERICAL RELAY TESTING_3RD YEAR	1	NO
133	500	10	KARUR	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	1	NO
134		20	KARUR	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	1	NO
135		30	KARUR	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	1	NO
136	510	10	KARUR	NUMERICAL RELAY TESTING_1ST YEAR	1	NO
137		20	KARUR	NUMERICAL RELAY TESTING_2ND YEAR	1	NO
138		30	KARUR	NUMERICAL RELAY TESTING_3RD YEAR	1	NO
139	520	10	KRISHNAPATNAM	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	55	NO

140		20	KRISHNAPATNAM	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	55	NO
141		30	KRISHNAPATNAM	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	55	NO
142	530	10	KRISHNAPATNAM	NUMERICAL RELAY TESTING_1ST YEAR	55	NO
143		20	KRISHNAPATNAM	NUMERICAL RELAY TESTING_2ND YEAR	55	NO
144		30	KRISHNAPATNAM	NUMERICAL RELAY TESTING_3RD YEAR	55	NO
145	540	10	ONGOLE & IP2	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	14	NO
146		20	ONGOLE & IP2	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	14	NO
147		30	ONGOLE & IP2	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	14	NO
148	550	10	ONGOLE & IP2	NUMERICAL RELAY TESTING_1ST YEAR	10	NO
149		20	ONGOLE & IP2	NUMERICAL RELAY TESTING_2ND YEAR	10	NO
150		30	ONGOLE & IP2	NUMERICAL RELAY TESTING_3RD YEAR	10	NO
151	560	10	MALKAPUR & IP3	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	10	NO
152		20	MALKAPUR & IP3	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	10	NO
153		30	MALKAPUR & IP3	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	10	NO
154	570	10	MALKAPUR & IP3	NUMERICAL RELAY TESTING_1ST YEAR	12	NO
155		20	MALKAPUR & IP3	NUMERICAL RELAY TESTING_2ND YEAR	12	NO
156		30	MALKAPUR & IP3	NUMERICAL RELAY TESTING_3RD YEAR	12	NO
157	580	10	URAN	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	15	NO
158		20	URAN	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	15	NO
159		30	URAN	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	15	NO
160	590	10	URAN	NUMERICAL RELAY TESTING_1ST YEAR	1	NO
161		20	URAN	NUMERICAL RELAY TESTING_2ND YEAR	1	NO

162		30	URAN	NUMERICAL RELAY TESTING_3RD YEAR	1	NO
163	600	10	PANKI & MAHEBA	ELECTROMECHANICAL RELAY TESTING_1ST YEAR	17	NO
164		20	PANKI & MAHEBA	ELECTROMECHANICAL RELAY TESTING_2ND YEAR	17	NO
165		30	PANKI & MAHEBA	ELECTROMECHANICAL RELAY TESTING_3RD YEAR	17	NO
166	610	10	PANKI & MAHEBA	NUMERICAL RELAY TESTING_1ST YEAR	14	NO
167		20	PANKI & MAHEBA	NUMERICAL RELAY TESTING_2ND YEAR	14	NO
168		30	PANKI & MAHEBA	NUMERICAL RELAY TESTING_3RD YEAR	14	NO

SECTION 04 – TECHNICAL QUALIFICATIONS REQUIREMENT

Bidder is required to submit the required documents as a part of technical bid qualification.

Failing to furnish all pertinent information & documents as per the technical bid qualification requirement mentioned in the tender documents, the bid stands rejected.

1. DECLARATION: CONFIRMATION OF UNDERSTANDING THE SCOPE OF WORK.
2. DECLARATION: DEPLOYMENT OF EQUIPMENT
3. TECHNICAL FORM NO. 3

DECLARATION: CONFIRMATION OF UNDERSTANDING THE SCOPE OF WORK

(To be submitted on Company letterhead duly filled, signed & stamped)

Date: _____

To,
Bharat Petroleum Corporation Limited
'A' Installation, Sewree Fort Road, Sewree (E), Mumbai 400015

Subject: Confirmation of Understanding the Scope of Work

Bid Reference No: _____

Tender Title: _____

I/We hereby confirm that we have read and understood the subject tender documents consisting of Scope of Work, Technical Specifications and Special Conditions of the Contract including corrigendum for the abovementioned bid no.

We confirm that we have no deviation from the published tender conditions in Scope of Work, Technical Specifications and Special Conditions of the Contract including corrigendum for the above-mentioned bid no.

We agree to comply and will adhere strictly to all the terms & conditions mentioned in the subject tender documents.

Sign & Stamp: _____

DECLARATION: DEPLOYMENT OF EQUIPMENT

(To be submitted on Company letterhead duly filled, signed & stamped)

Date: _____

To,
Bharat Petroleum Corporation Limited
Pipelines-HQ, Sewree, Mumbai 400015

Subject: Confirmation regarding Deployment of Equipment for Works

Bid Reference No: _____

Tender Title: _____

I/We hereby confirm that we have read and understood the minimum set of equipment required for execution of work. We propose to deploy the following models of equipment at site for execution of the work:

Sr No	Equipment / Instruments	Make	Make/Model No. (to be deployed)
1	Software for System Study and Relay Coordination Study	ETAP / PSCAD / equivalent	
2	Universal Automatic Computerized Relay Test Kit with provision of 3-phase + neutral simultaneous injection	OMICRON CMC 256/256 PLUS/356 or equivalent	

We confirm that the above equipment shall be of the latest model available in the market and shall not be older than 5 years from the original bid due date. Upon award of the job, we shall submit documentary proof of purchase for the instruments listed above, along with valid Instrument Proving certificates.

Sign & Stamp: _____

DECLARATION: TECHNICAL FORM NO. 3

(To be submitted on Company letterhead duly filled, signed & stamped)

Date: _____

Subject: Technical Form No. 3

Bid Reference No: _____

Tender Title: _____

S. No.	Technical Requirement / Condition	Vendor Acknowledgement (Yes/No)	Remarks / Supporting Documents Submitted
1	Bidder shall clearly mention the name of the software proposed for System Study and Relay Coordination Study along with details of its capabilities.	Yes / No	
2	Bidder shall submit valid proof of software licence as on the bid due date.	Yes / No	
3	If licence validity is not available as on bid due date, bidder may submit an undertaking to renew the licence within one month of award of contract.	Yes / No / Not Applicable	
4	Bidder confirms that the software licence will be renewed within one month of award of contract (if applicable).	Yes / No / Not Applicable	
5	Post-award, bidder shall use the most recent released version of the software, not older than 5 years from the bid due date.	Yes / No	Version details:
6	Bidder shall demonstrate qualifications and technical capability of proposed project staff by providing proof of training from the original software developer OR documentary proof of jobs executed using the selected software.	Yes / No	
7	If bidder does not own the software, they may engage an expert agency that owns the software, provided a valid legal agreement between bidder and software owner is submitted.	Yes / No / Not Applicable	

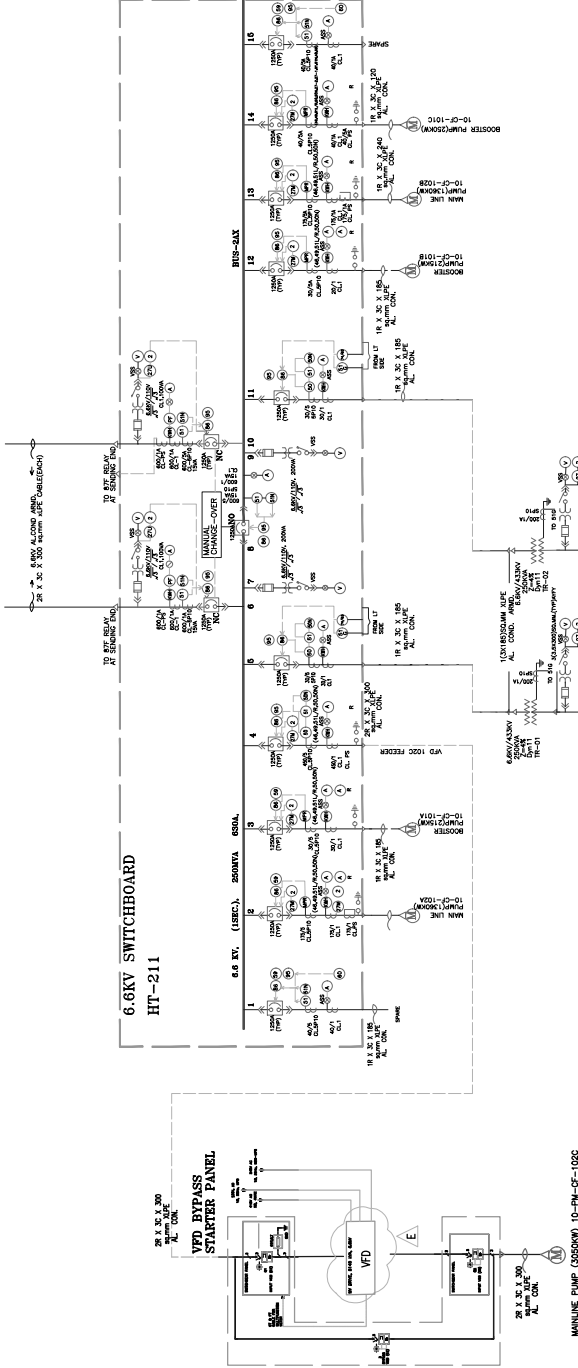
Sign & Stamp: _____

SECTION 05 – SINGLE LINE DIAGRAM

The bidder shall take note of the SLDs along with the specified updates that BPCL plans to implement over and above the equipment and loads currently represented in the SLD.

6.6KV SUPPLY FROM
SW/H-5 HT BOARD(2nd FLOOR)
PANEL-3

6.6KV SUPPLY FROM
SW/H-5 HT BOARD(2nd FLOOR)
PANEL-18



PMCC
PC-311

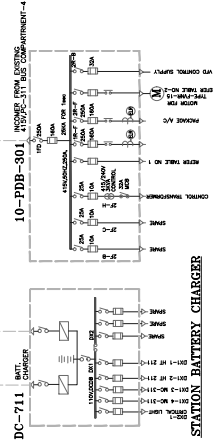
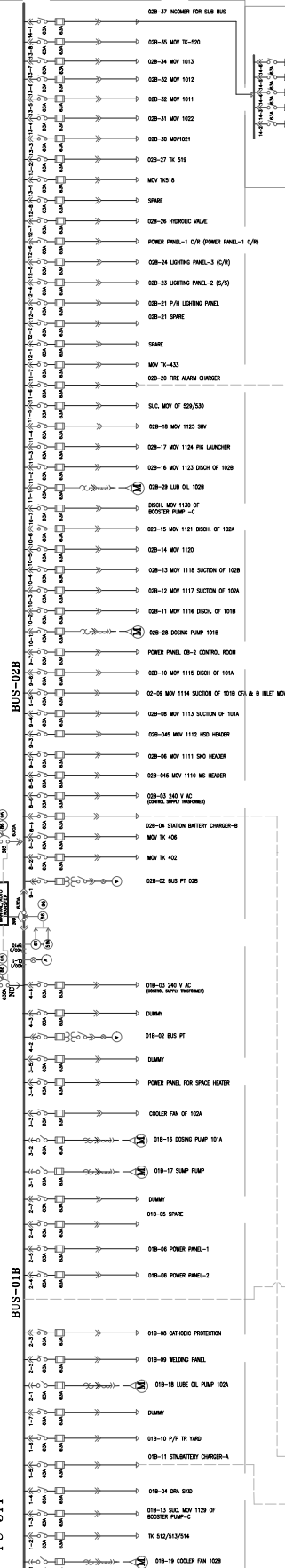


TABLE NO.1

SR.NO.	FDR. ON	NAME PLATE DESIGNATION	FDR RATING
1.	1R-D	MOV 1151	3.7KW
2.	2R-C	MOV 1152	3.7KW
3.	2R-D	MOV 1153	3.7KW

TABLE NO.2

SR.NO.	FDR. ON	NAME PLATE DESIGNATION	FDR RATING
1.	2F-D	AUX LUBE OIL HEATER	1.1KW
2.	2F-E	AUX LUBE OIL COOLER FAN#1	1.1KW
3.	2F-F	AUX LUBE OIL COOLER FAN#2	1.1KW
4.	2F-G	AUX LUBE OIL PUMP	1.1KW

STATION BATTERY CHARGER

FIRE ALARM BATTERY CHARGER

UPS ACDB

LEGEND :-

- VACUUM/SFC CIRCUIT BREAKER
- AIR CIRCUIT BREAKER
- HIGH OR LOW VOLTAGE DISCONNECT SWITCH
- MINIATURE CIRCUIT BREAKER
- CONTACTOR
- DRAW OUT FEATURE
- FUSE
- POTENTIAL TRANSFORMER
- CURRENT TRANSFORMER
- THERMAL OVERLOAD RELAY
- CABLE GLAND TERMINATION
- LIGHTNING ARRESTER
- MAGNETIC AND THERMAL RELEASE (O/C/E/F AND OVERLOAD RELEASE)
- SELECTOR SWITCH
- SURGE ABSORBER
- AMMETER
- VOLTMETER
- KILOWATT HOUR METER
- POWER FACTOR METER
- FREQUENCY METER
- LOCK OUT RELAY
- IDMT OVER CURRENT RELAY
- IDMT E/F RELAY
- INSTANTANEOUS O/C RELAY
- INSTANTANEOUS E/F RELAY
- STAND BY E/F RELAY
- AUX. RELAY FOR TRANSFORMER PROTECTION
- RESTRICTED E/F RELAY
- U/V RELAY
- TIME DELAY RELAY
- RESIDUAL VOLTAGE CHECK RELAY
- HEALTHY VOLTAGE CHECK RELAY
- U/V RELAY FOR MOTOR TRIPPING
- MOTOR PROTECTION RELAY
- OVER VOLTAGE RELAY
- RESIDUAL VOLTAGE RELAY
- THERMAL OVER LOAD RELAY
- NEGATIVE PHASE SEQUENCE RELAY
- MOTOR LOCKED ROTOR RELAY
- TRIP CIRCUIT SUPERVISION RELAY
- DIFFERENTIAL RELAY
- MOTOR DIFFERENTIAL RELAY
- TRIP DIFFERENTIAL RELAY



NEELSHANKAR SHINHA
NEELSHANKAR SHINHA
Bharat Petroleum Corporation Limited

NO.	REVISION	DATE	BY	CHKD.
1	ISSUED FOR TENDER	10/01/2011	NEELSHANKAR SHINHA	NEELSHANKAR SHINHA
2	AS BUILT	10/01/2011	NEELSHANKAR SHINHA	NEELSHANKAR SHINHA

B.P.C.L.
MUMBAI-MANMAD PIPELINE
MAIN SINGLE LINE DIAGRAM
MUMBAI DISPATCH TERMINAL

SCALE	FOR NO.	UNIT NO.	SECT.	DISCHARGE	REV.
NTS	3674	10	16	50	0011 F

22KV SUPPLY FROM
MSEB SWITCHYARD

22KV SUPPLY FROM
MSEB SWITCHYARD

22KV SWITCHBOARD
HT-220

6.6KV SWITCHBOARD
HT-221

PMCC
PC-321

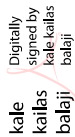
DC-721

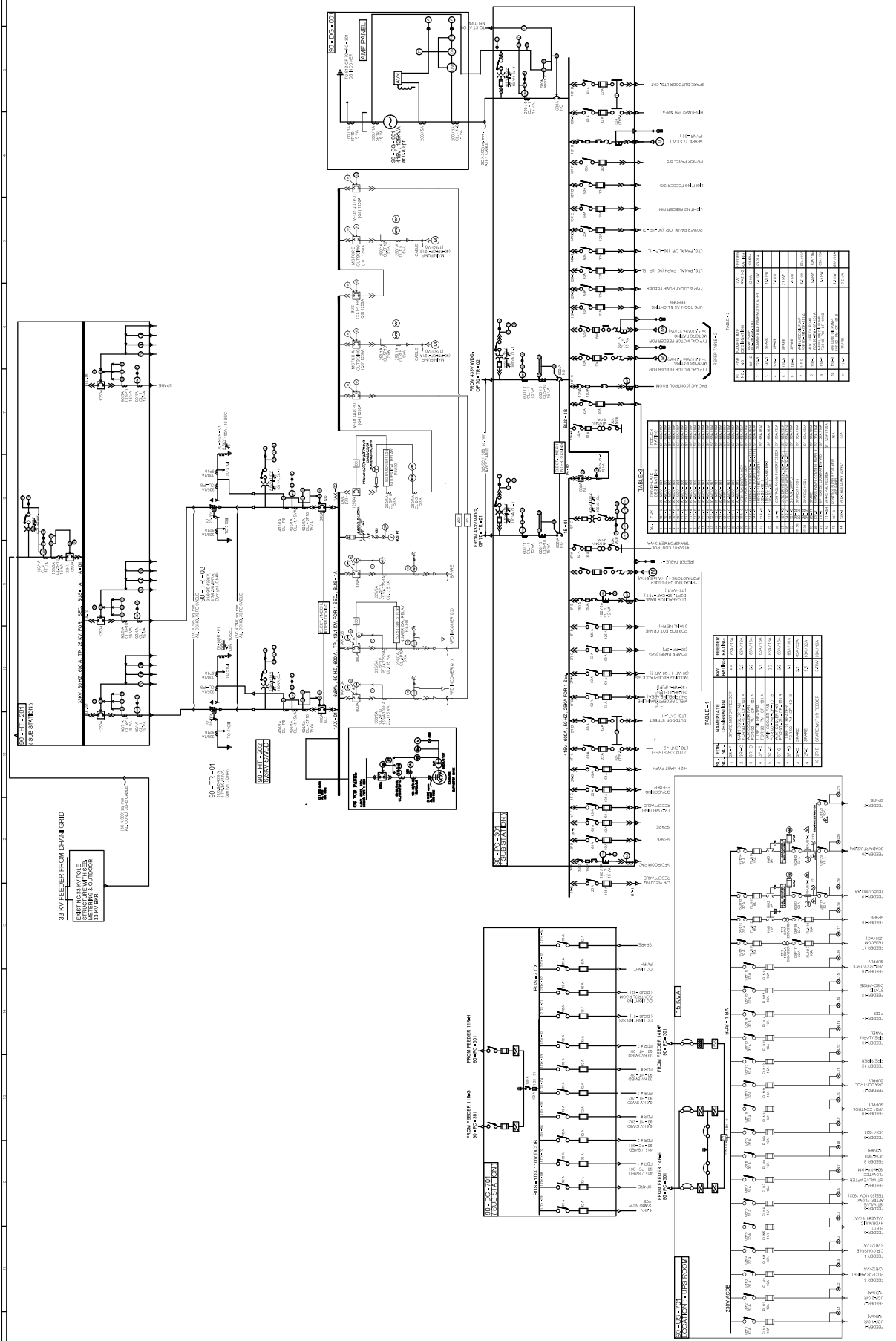
STATION BATTERY CHARGER

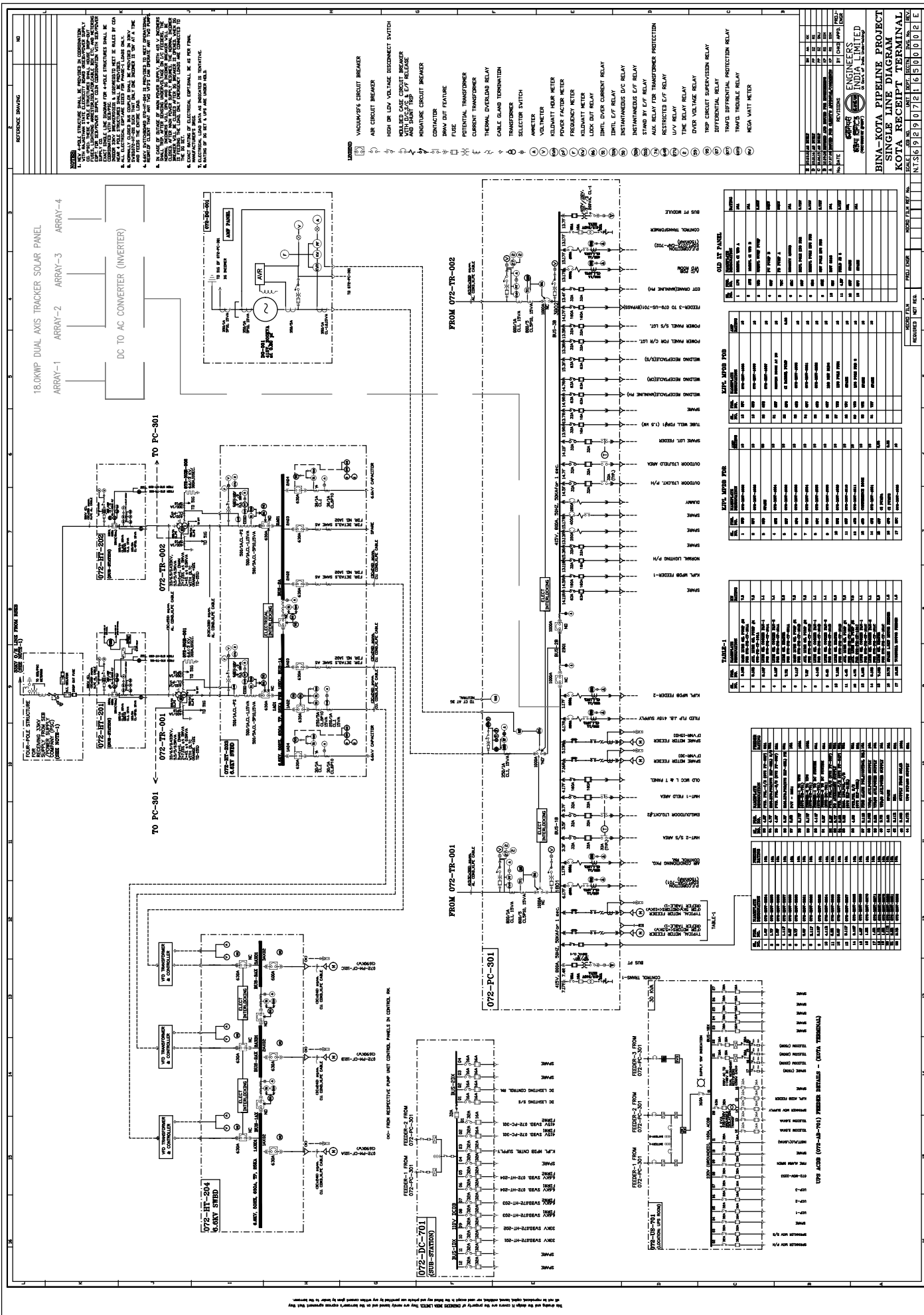
LEGEND :-

- VACUUM CIRCUIT BREAKER
AIR CIRCUIT BREAKER
HIGH OR LOW VOLTAGE DISCONNECT SWITCH
MINIATURE CIRCUIT BREAKER
CONTACTOR
DRAW OUT FEATURE
FUSE
POTENTIAL TRANSFORMER
CURRENT TRANSFORMER
THERMAL OVERLOAD RELAY
CABLE GLAND TERMINATION
LIGHTNING ARRESTER
MAGNETIC AND THERMAL RELEASE
(O/C/E/F AND OVERLOAD RELEASE)
SELECTOR SWITCH
SURGE ABSORBER
AMMETER
VOLTMETER
KILOWATT HOUR METER
POWER FACTOR METER
FREQUENCY METER
LOCK OUT RELAY
DUAL OVER CURRENT RELAY
DUAL E/F RELAY
INSTANTANEOUS O/C RELAY
STAND BY E/F RELAY
AUX. RELAY FOR TRANSFORMER PROTECTION
RESTRICTED E/F RELAY
U/V RELAY
TIME DELAY RELAY
RESIDUAL VOLTAGE CHECK RELAY
HEATING VOLTAGE CHECK RELAY
U/V RELAY FOR MOTOR TRIPPING
MOTOR PROTECTION RELAY
OVER VOLTAGE RELAY
RESIDUAL VOLTAGE RELAY
THERMAL OVER LOAD RELAY
NEGATIVE PHASE SEQUENCE RELAY
MOTOR LOCKED MOTOR RELAY
TRIP CIRCUIT SUPERVISION RELAY
DIFFERENTIAL RELAY
MOTOR DIFFERENTIAL RELAY
TWVD DIFFERENTIAL RELAY

B.P.C.L		MUMBAI-MANMAD PIPELINE	
MAIN SINGLE LINE DIAGRAM		IPS MANMAD	
SCALE	1:1000	DATE	00/11/00
NO.	3674	10	16
NYS	3674	10	16
REV.	0011	50	0011
F			







NOTES:
1. NEW PAGES SHOWN IN BRACKETED FORM. COORDINATE WITH THE PREVIOUS PAGES.
2. ALL CIRCUITS ARE TO BE DESIGNED TO THE REQUIREMENTS OF THE INDIA STANDARD SPECIFICATION FOR ELECTRICAL EQUIPMENT.
3. ALL CIRCUITS ARE TO BE DESIGNED TO THE REQUIREMENTS OF THE INDIA STANDARD SPECIFICATION FOR ELECTRICAL EQUIPMENT.
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10. ALL CIRCUITS ARE TO BE DESIGNED TO THE REQUIREMENTS OF THE INDIA STANDARD SPECIFICATION FOR ELECTRICAL EQUIPMENT.

- LEGEND
- VACUUM/FEI CIRCUIT BREAKER
 - AIR CIRCUIT BREAKER
 - HIGH OR LOW VOLTAGE DISCONNECT SWITCH
 - MOLDED CASE CIRCUIT BREAKER
 - MINIATURE CIRCUIT BREAKER
 - CONTACTOR
 - DRAW OUT FRAME
 - FUSE
 - POTENTIAL TRANSFORMER
 - CURRENT TRANSFORMER
 - THERMAL OVERLOAD RELAY
 - CABLE CLAMP TERMINATING
 - TRANSFORMER
 - SELECTOR SWITCH
 - AMMETER
 - VOLTMETER
 - KILOWATT HOUR METER
 - POWER FACTOR METER
 - FREQUENCY METER
 - KILOWATT METER
 - TRIPPING RELAY
 - ENL OVER CURRENT RELAY
 - ENL L/F RELAY
 - INSTANTANEOUS O/C RELAY
 - INSTANTANEOUS E/F RELAY
 - STAND BY E/F RELAY
 - AUX. RELAY FOR TRANSFORMER PROTECTION
 - RESTRICTED E/F RELAY
 - CONTROL SUPPLY SUPERVISION
 - U/F RELAY
 - NEUTRAL DISPLACEMENT RELAY
 - TIME DELAY RELAY
 - OVER VOLTAGE RELAY
 - TRIP CIRCUIT SUPERVISION RELAY
 - DIFFERENTIAL RELAY
 - TRIP DIFFERENTIAL PROTECTION RELAY
 - TRIP ROUBLE RELAY
 - MEGA WATT METER
 - NUMERICAL RELAY
 - NUMERICAL RELAY
 - NUMERICAL RELAY

ENGINEERS
INDIA
LIMITED

REVISIONS

No.	Date	By	For	Remarks
1	10/10/1984	...	...	...
2	...	...	...	...
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ENGINEERS
INDIA
LIMITED

REVISIONS

No.	Date	By	For	Remarks
1	10/10/1984	...	...	...
2	...	...	...	...
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33KV 6/11 LINE FROM HADAPUT GDS
(SEE NOTE-1)

FOR-POLE STRUCTURE
(SEE NOTE-1)

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(SEE NOTE-1)

073-HT-001
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073-HT-002
6.6KV SWD

073-HT-003
6.6KV SWD

073-HT-004
6.6KV SWD

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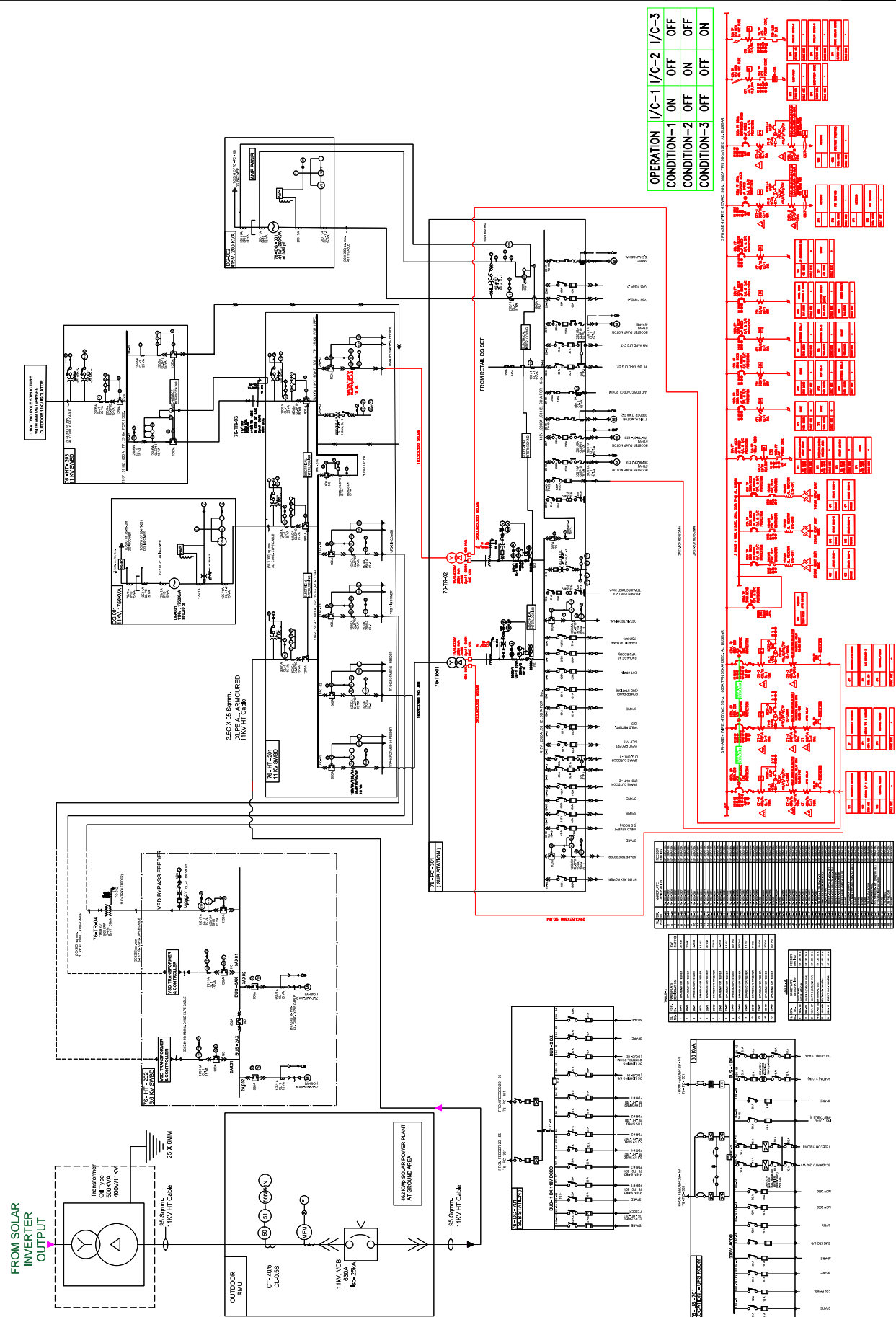
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6.6KV SWD

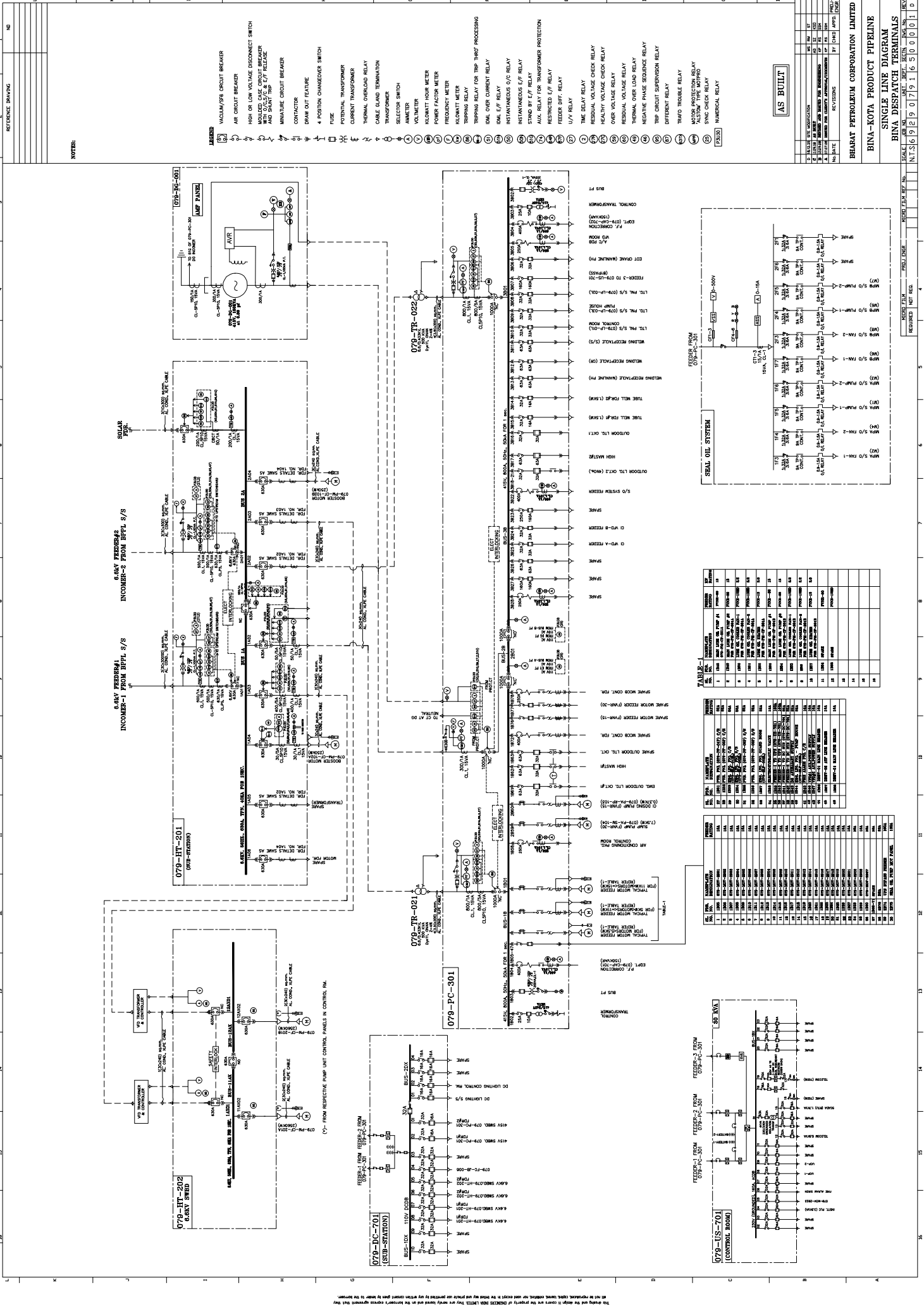
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6.6KV SWD

073-HT-005
6.6KV SWD

073-HT-006
6.6KV SWD

073-HT-007
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[illegible]



NOTES:

- 1. VOLUME/50% CIRCUIT BREAKER
- 2. AIR CIRCUIT BREAKER
- 3. HIGH OR LOW VOLTAGE DISCONNECT SWITCH
- 4. MINIMUM 10% OVERLOAD RELAY
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AS BUILT

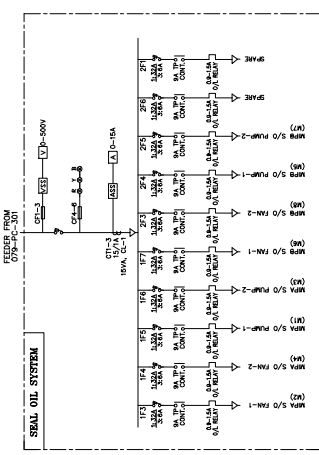


TABLE-1

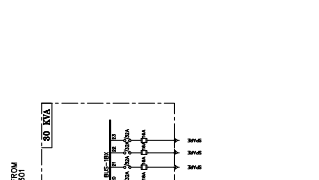
NO.	DESCRIPTION	REMARKS
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4	SEAL OIL PUMP	
5	SEAL OIL PUMP	
6	SEAL OIL PUMP	
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14	SEAL OIL PUMP	
15	SEAL OIL PUMP	

TABLE-2

NO.	DESCRIPTION	REMARKS
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6	SEAL OIL PUMP	
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12	SEAL OIL PUMP	
13	SEAL OIL PUMP	
14	SEAL OIL PUMP	
15	SEAL OIL PUMP	

TABLE-3

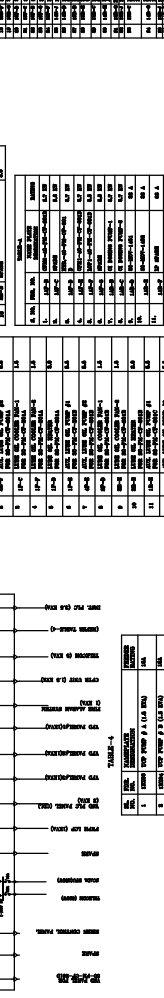
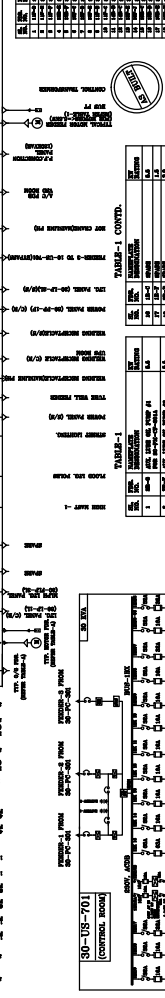
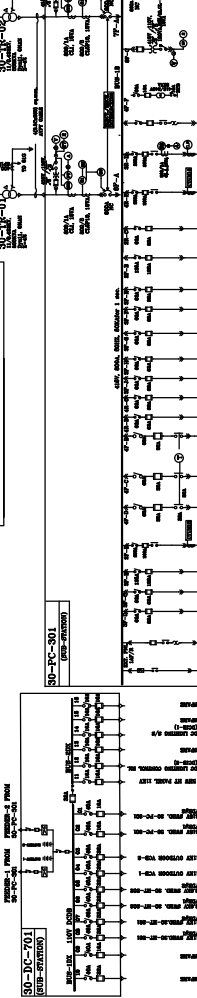
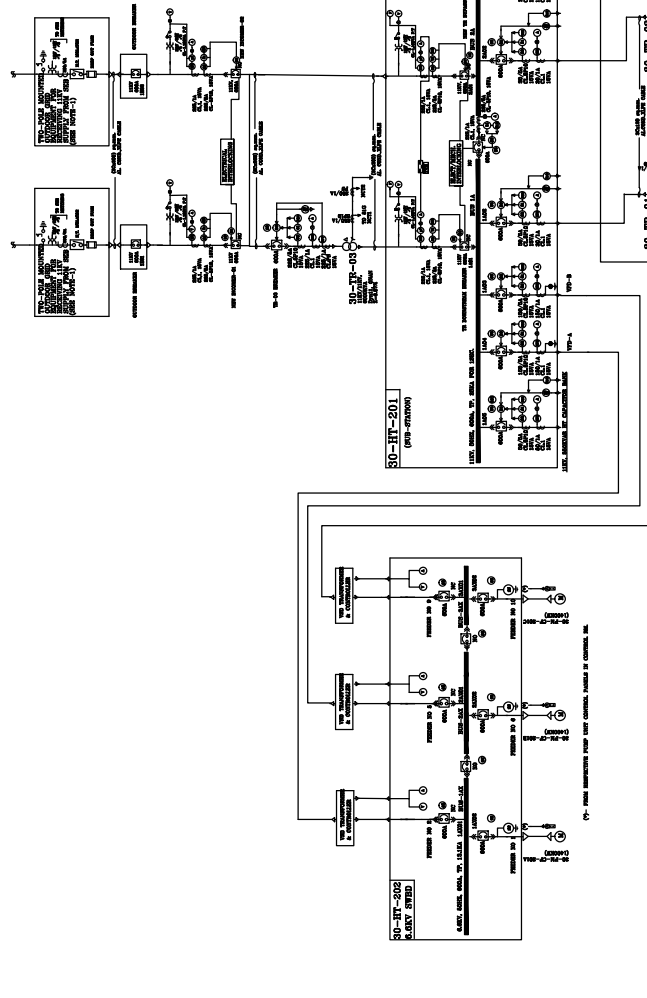
NO.	DESCRIPTION	REMARKS
1	SEAL OIL PUMP	
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3	SEAL OIL PUMP	
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12	SEAL OIL PUMP	
13	SEAL OIL PUMP	
14	SEAL OIL PUMP	
15	SEAL OIL PUMP	



BEARAT PETROLEUM CORPORATION LIMITED
BINA-KOTA PRODUCT PIPELINE
SINGLE LINE DIAGRAM
BINA DESPATCH TERMINALS
N.T.S. 6/9/29 079 16500001
REV. 01
DATE 07/09/2009
BY 079/001/001
CHECKED 079/001/001
APPROVED 079/001/001
DESIGNER 079/001/001
DRAWN 079/001/001
SCALE 1:1
SHEET NO. 01
TOTAL SHEETS 01

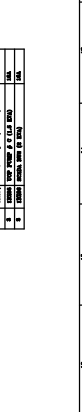
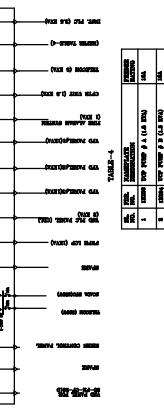
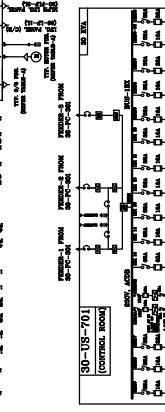
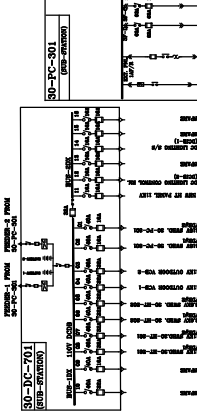
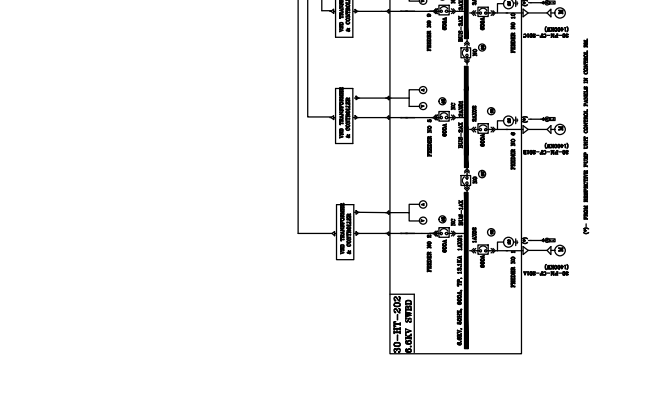
115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)

115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)



115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)

115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)



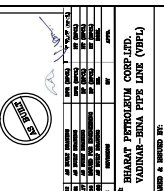
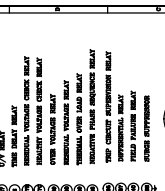
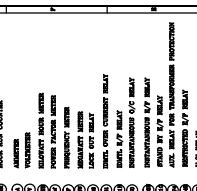
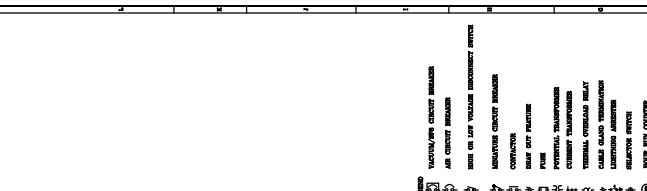
115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)

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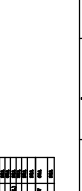
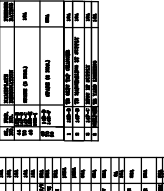
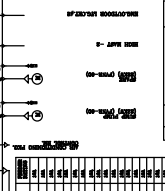
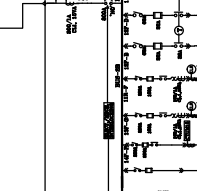
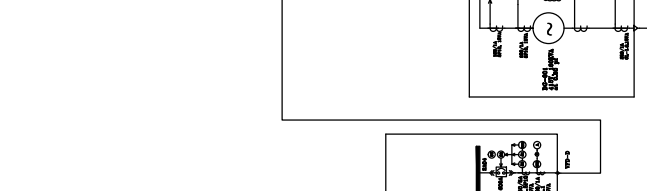
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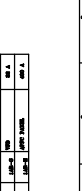
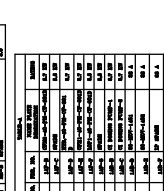
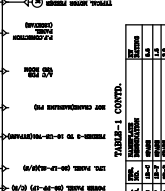
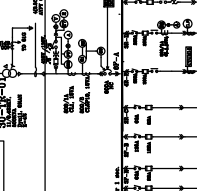
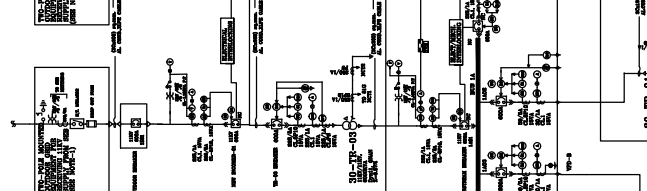
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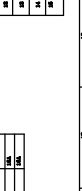
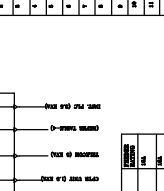
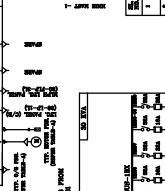
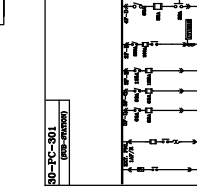
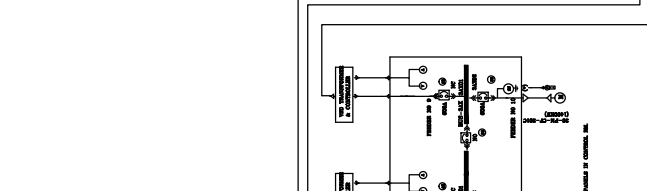
115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)

115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)



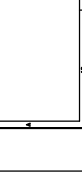
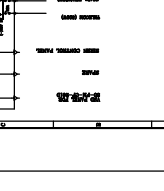
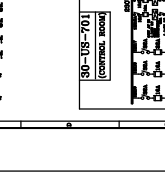
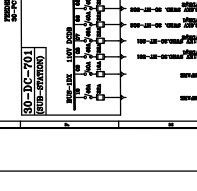
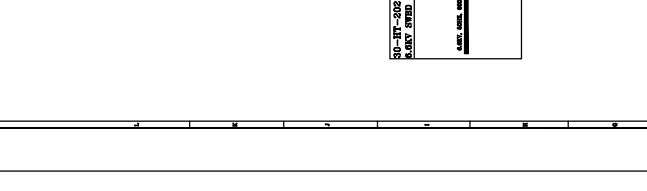
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TRANSFORMER (SEE NOTE-1)

115V FEEDBACK FROM 60/115V
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115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)

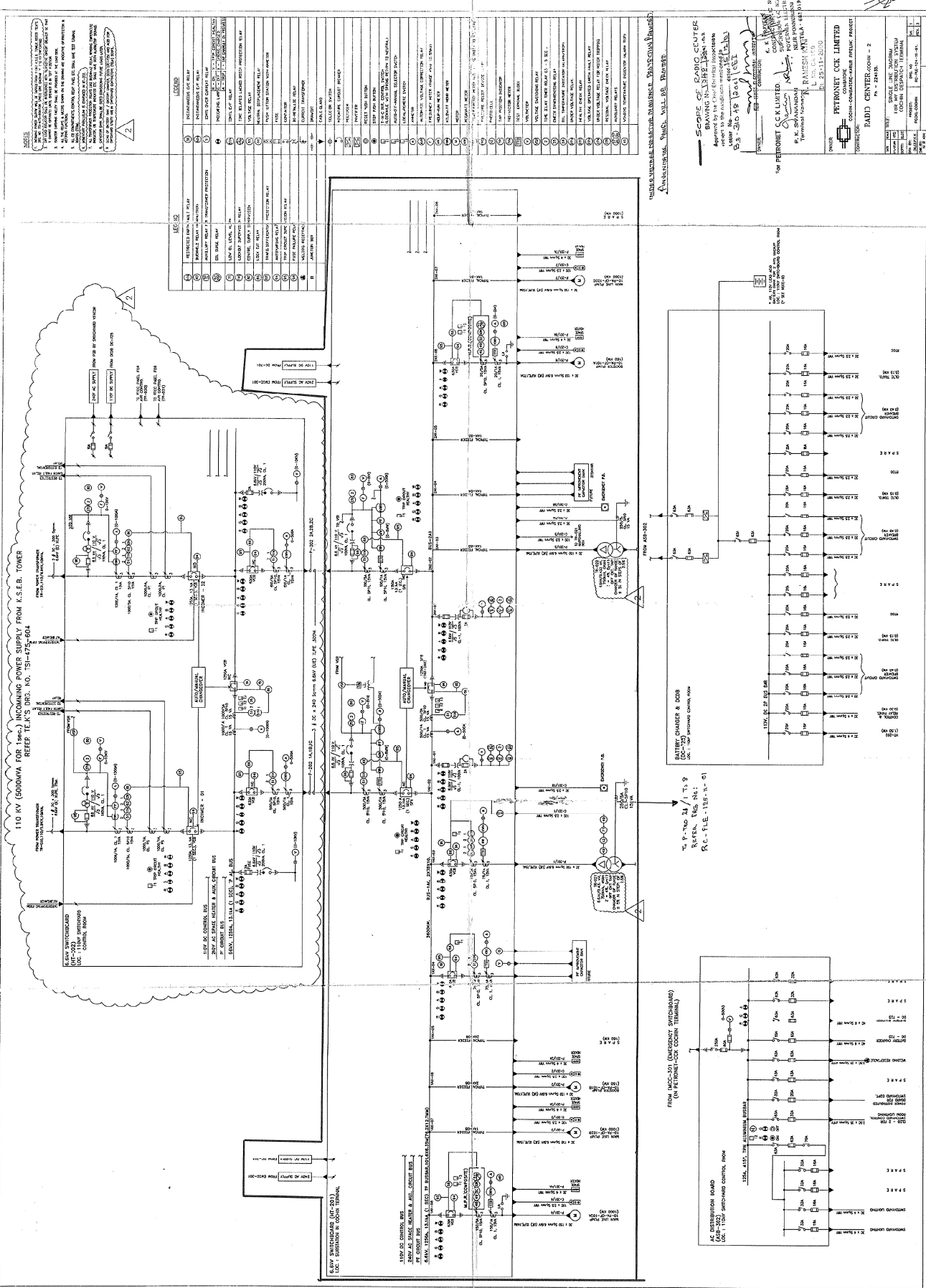
115V FEEDBACK FROM 60/115V
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115V FEEDBACK FROM 60/115V
TRANSFORMER (SEE NOTE-1)





110 KV (5000VA) INCOMING POWER SUPPLY FROM K.S.E.B. TOWER
REFER TEJA'S DRG. NO. TSI-475-604

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5KV/0.4KV

110KV/5KV
5KV/0.4KV

110KV/5KV
5KV/0.4KV

110KV/5KV
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110KV/5KV
5KV/0.4KV

110KV/5KV
5KV/0.4KV

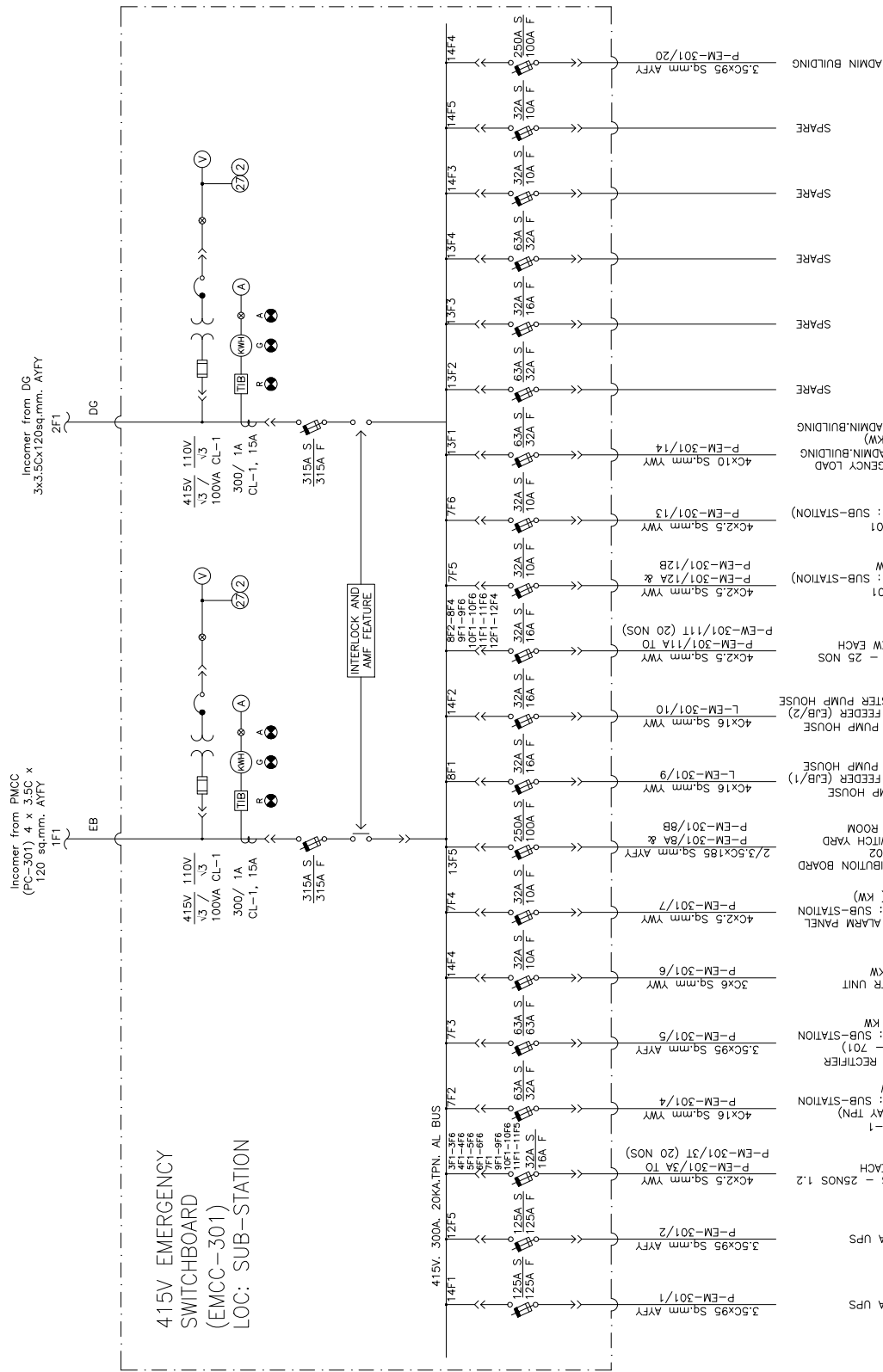
110KV/5KV
5KV/0.4KV

110KV/5KV
5KV/0.4KV

110KV/5KV
5KV/0.4KV

110KV/5KV
5KV/0.4KV

110KV/5KV
5KV/0.4KV



BHARAT PETROLEUM CORPORATION LTD.

Title
SINGLE LINE DIAGRAM FOR
415V EMERGENCY
SWITCHBOARD (EMCC-301)

Prepared By	MEC
Checked By	
Approved By	

DATE : _____

